

The relationship between entrepreneurial experience and preferred learning styles

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Abstract

Purpose

Entrepreneurship is a process of learning. The entrepreneurial learning process incorporates a cumulative series of multifaceted entrepreneurial experiences, which generally involve the development of new insights and behaviours. This study aimed to determine whether entrepreneurial experience has an influence on the preferred learning styles of students. The study also investigated the appropriateness of the Reduced Kolb Learning Style Inventory as a measuring instrument.

Design/methodology/approach

The study was conducted on 586 male and 690 female students from South Africa ($n = 1042$) and Norway ($n = 244$). The Reduced Kolb Learning Style Inventory, making use of principal correspondence analysis, was used to determine the preferred learning styles, while the students' level of entrepreneurial experience was captured by items addressing prior entrepreneurial experience.

Findings

The analysis revealed a simpler measure of students' preferred learning styles, comprising a total of 12 items with three items per learning style. The study revealed that the preferred learning style was more important for students who had entrepreneurial experience than for those with less entrepreneurial experience. If students with entrepreneurial experience have stronger concerns for how they learn, it contributes to the understanding of the content of entrepreneurial learning.

Originality/value

A modified Reduced Kolb Learning Style Inventory resulted in a concise instrument measuring students' preferred learning style in adherence to Kolb's work and evidenced its usefulness. This study contributes to a field that has been under-researched, related to the association between students' past and current entrepreneurial experience and their learning style preference, and aims to bridge the two research fields. This research explores these links and points to how these insights could inform entrepreneurship education.

Keywords

Experiential learning, Learning styles, Entrepreneurial learning, Entrepreneurial experience, Kolb learning styles

Introduction

This paper investigates the relationship between entrepreneurial experience and preferred learning styles in a university context. Studies on learning styles have mostly focussed on how to adjust educational offerings to students with a given set of stable preferred learning styles (Dunn and Dunn, 1999; Dunn and Griggs, 2000; Pheiffer *et al.*, 2005; Jepsen *et al.*, 2015; Yousef, 2018). The learning process is then enhanced when the didactics accommodate and support the various learning styles of the learners (Kolb, 1984; Buch and Sena, 2001; Goulding and Syed-Khuzzan, 2014). As students differ in their backgrounds, profiles and learning styles (Kurczewska *et al.*, 2018), it is vitally important that their learning experience is adjusted accordingly to spur motivation and learning efficiency (Vincent and Ross, 2001; Goulding and Syed-Khuzzan, 2014). This study regards learning styles as dynamic and seeks to explore experiences that contribute to this preferred learning style. This is done by combining theories on learning styles and entrepreneurial learning. Entrepreneurial learning emphasises meta-learning as the key to enhanced entrepreneurial abilities as the entrepreneurial experience grows. To the authors' knowledge, this conceptual and empirical relationship has hardly been investigated. This study is inspired by the call of Kurczewska *et al.* (2018) for research that improves our understanding of the interplay between learning styles and student learning.

There is a need to bridge the research streams of entrepreneurial learning and learning styles. “*Entrepreneurship is a learning process, and a theory of entrepreneurship requires a theory of learning*” (Minniti, 2010, p. 9). In order to develop a theoretical framework, an investigation was conducted on entrepreneurial learning theory and learning styles theory and on the link between these theories.

The paper concentrates on the learning styles literature that has used Kolb's Learning Style Inventory (KLSI). Scant research has investigated the empirical relationships between entrepreneurial learning and learning styles. The paper therefore draws on a diverse range of literature and links insights from these research streams to enhance the understanding of the conceptual and empirical relationships across the literature.

The paper then aims to identify the connection between entrepreneurial experience and preferred learning styles via the following research questions:

RQ1. Will students with entrepreneurial experience have different preferred learning styles from those without entrepreneurial experience?

RQ2. Will students with entrepreneurial experience be more aware of their learning styles than those without entrepreneurial experience?

The theoretical framework ends with a discussion of how entrepreneurial experience and learning styles have been measured and used by researchers. The method section details how the data was collected, how principal correspondence analysis (PCrA) was applied, how measures of the students' preferred learning style were built and how the analysis linked the

students' preferred learning style to their entrepreneurial experience in order to tease out the core of entrepreneurial learning. The data analysis sums up the results and includes novel findings to add to the existing literature in the field. The conclusion section discusses the implications for research and practice. Thus, this paper contributes to the understanding of how entrepreneurial experience influences the preferred learning styles of students.

Theoretical framework

Entrepreneurial learning and entrepreneurial experience

Entrepreneurial learning is a research field positioned at the boundary between learning theory and the entrepreneurship phenomenon (Wang and Chugh, 2014). Entrepreneurial learning is intrinsically related to the experience of business creation, and the concept can be defined as recognising and acting “*on opportunities, through initiating, organizing, and managing ventures in social and behavioral ways*” (Rae, 2006, p. 40). Moreover, entrepreneurial learning implies a lived experience that incorporates a cumulative sequence of inter-reliant entrepreneurial tasks, activities and events. The entrepreneurial learning process also commonly involves the maturing of new insights and behaviours, resulting in a change of current insights and behaviours. Entrepreneurial learning has become a promising field among entrepreneurship scholars (Politis, 2005; Rae, 2006; Wang and Chugh, 2014), and researchers have investigated how, what and with whom entrepreneurs learn and the associated learning process. Entrepreneurial learning can occur in social settings with important others, such as the entrepreneurial team, and in encounters with customers, suppliers, competitors and investors (Wang and Chugh, 2014).

Entrepreneurship scholars have emphasised various learning aspects, such as learning by doing (Cope, 2003), learning by trial and error (Cope, 2011) and learning from past and particularly complex and ambiguous experiences and situations, referred to as critical events evoking feelings (Pittaway and Thorpe, 2012). Entrepreneurs' learning-by-doing is assumed to produce a change in their subconscious that occurs gradually over time. Moreover, if the entrepreneur has the ability to stand back from the concrete tasks to reflect on performed actions, he or she will deepen the learning (Cope and Watts, 2000; Pittaway and Thorpe, 2012).

Entrepreneurship scholars have also emphasised emotions as an integral part of the entrepreneurship process (Cope, 2011; Foo *et al.*, 2009; Hayton and Cholakova, 2012; Muehlfeld *et al.*, 2017; Podoynitsyna *et al.*, 2012). Entrepreneurs are often described as passionate, enthusiastic and enduring even when faced with difficulty and various challenges that occur when a new venture is established (Foo *et al.*, 2009). Entrepreneurs have to cope constantly with uncertainty and ambiguity, high pressure and tension and the need to take action immediately. Situations such as these are emotional and are likely to affect and influence entrepreneurial decisions and behaviours (Hayton and Cholakova, 2012).

Substantial research has investigated the impact of entrepreneurial experience on entrepreneurs' mindsets, strategies, abilities, resources and other factors (e.g. Baron and Ensley, 2006; Robson *et al.*, 2013; Aarstad *et al.*, 2016). Studies comparing novices with serial and portfolio (experienced) entrepreneurs have been particularly valuable in this respect (e.g. Baron and Ensley, 2006; Dew *et al.*, 2009; Aarstad *et al.*, 2016). Entrepreneurial experience generally has proven to enhance entrepreneurs' resources, networks and abilities to develop and establish successful ventures (Aarstad *et al.*, 2016). Research has also explained that prior entrepreneurial experience and the associated learning tend to change and

adjust individuals' mindsets and strategic orientations (Baron and Ensley, 2006; Dew *et al.*, 2009). Experienced entrepreneurs are found to be more decisive, self-confident and pragmatic in strategic choices (Aarstad *et al.*, 2016).

Learning styles

According to Smilor (1997), an effective entrepreneur exhibits four elements: talent, opportunity, capital and know-how. *“In this regard, effective entrepreneurs are exceptional learners. They learn from everything”* (Smilor, 1997, p. 344). Individuals use different learning styles in different conditions, which is why the numerous learning style models found in the literature have dealt with different factors, including cognitive, affective, environmental and psychological. The majority of learning style models are concerned with the process of learning (the how) rather than the content (the what) and mainly involve individuals rather than groups. The traditional approach to applying learning styles is to adjust the didactics to the particular student's preferred learning style. The underlying assumption, then, is that each individual has a specific preferred learning style and that a match will lead to higher levels of achievement (Pheiffer *et al.*, 2005). Learning style models have been summarised by various authors (Claxton and Murrell, 1987; Hilgersom-Volk, 1987; De Bello, 1990; Toms, 2007). A summary of the experiential learning theory (ELT) of Kolb and the KLSI, which form the basis of the Reduced Kolb Learning Style Inventory (RLSI) of Manolis *et al.* (2013), which is used in this study, is given further.

Kolb's ELT defines learning as *“the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience”* (Kolb, 1984, p. 41). ELT places the emphasis on the process of learning and not on the behavioural outcomes associated with learning. The theory is based on how people grasp (perceive) and transform (process) experience, resulting in four dialectically related modes: concrete experience (CE), reflective observation (RO), abstract conceptualisation (AC) and active experimentation (AE), as shown in Figure 1. The combinations of the learning modes form four learning styles: diverging (CE/RO), assimilating (RO/AC), converging (AC/AE) and accommodating (AE/CE). The KLSI 4.0 has developed into a nine learning-style typology, with four of these style types emphasising the four learning modes – that is, experiencing (CE), reflecting (RO), thinking (AC) and acting (AE) (Kolb and Kolb, 2013). In this paper, we refer further to the four learning modes as “learning styles”. The learning cycle is a process, with one mode feeding into the others – for example, CE forms the basis for RO via AC towards AE – which again could create new schemas for action and behaviour (Piaget, 1970).

In an idealised learning cycle, the learner uses all four styles to some extent, with a preferred learning style for grasping and transforming an experience. The effective learner can use each of the four styles in different learning situations, rather than relying only on a preferred style. The Kolb learning style model remains very popular (Loo, 1999; Kayes, 2005; Demirbas and Demirkan, 2007) and fulfils one of its main purposes: *“To serve as an educational tool to increase individuals' understanding of the process of learning from experience and their unique individual approach to learning”* (Kolb and Kolb, 2013, p. 40). The KLSI can assist individuals to interpret and reflect on learning preferences and their application in different settings.

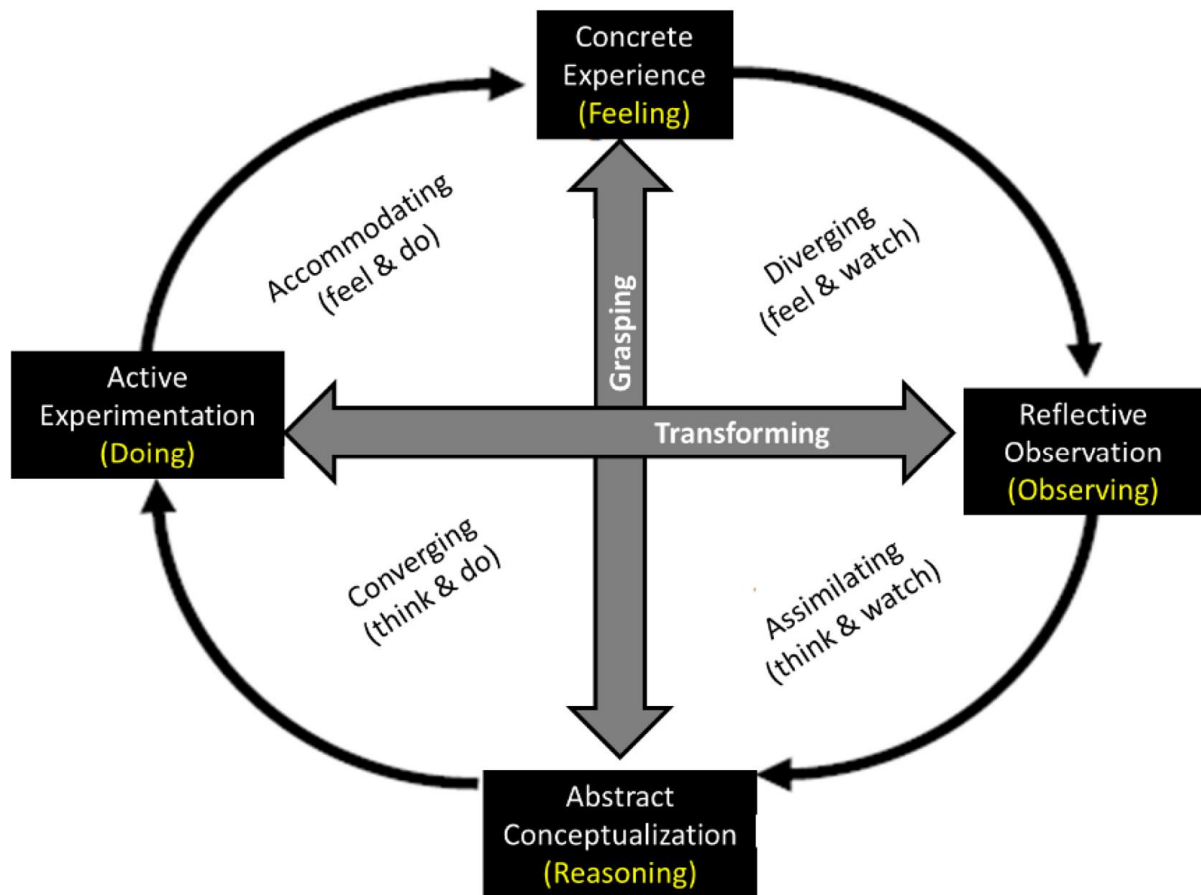


Figure 1. Experiential learning cycle (adapted from Kolb and Kolb, 2008)

Entrepreneurial experience and learning styles

Research over several decades has shown that learning styles are influenced by, for example, personality type and educational speciality (Kolb, 1984; Kolb and Kolb, 2008, 2013). These studies have clearly indicated learning style preferences by educational speciality (and career choice) – for example, communication (sales) or nursing (social services). Although entrepreneurship is a career choice, it is not limited to a specific educational speciality; and this might partly explain the small amount of research that has been published on entrepreneurial experience and learning styles. Kolb (1976) notes that the preferred learning style may change over time as a result of educational influence, but also out of particular past-life experiences, as well as according to what the learning situation demands. Entrepreneurial experience could be such a past-life experience that influences the preferred learning style.

A few studies on the influence of entrepreneurial experience on learning styles have been published since the development of learning style inventories, and a summary is provided further. Balan and Ionita (2011) studied the organisational learning process of small enterprises and found a relationship between learning and entrepreneurial orientation. Pacalo's (2014) study explored entrepreneurial decision-making by using the construct of KLSI to examine an entrepreneurial small business operation. Kakouris *et al.* (2015) developed a conceptual framework to match experiential learning style with entrepreneurial opportunities that focussed on technology entrepreneurs, innovation and creativity.

Unpublished data by Gemmel (2017) as referenced in Kolb and Kolb (2013), in an investigation of 172 technology entrepreneurs, concluded that these kinds of entrepreneurs appear to achieve greater innovations. This results from longer decision-making and reflection on alternatives before action is taken. Gemmell (2017) modelled KLSI scores to explore causal links with individual- and firm-level entrepreneurial success in knowledge-intensive industries. A recent study by Honig and Hopp (2019) developed a theoretical framework based on entrepreneurs' learning orientation to assist in understanding when, and for whom, specific learning styles and new venture organisational activities are advantageous.

Research has mainly focussed on various aspects of experiential learning related to entrepreneurs and enterprise success, entrepreneurial opportunities and decision-making. To the authors' knowledge, no literature has reported on students with entrepreneurial experience and their preferred learning style. This paper will contribute to the understanding and knowledge of how entrepreneurial experience, which contributes to entrepreneurial learning, may link to the preferred learning styles of students.

Methodology

KLSI and other learning style measures have received both support and criticism over the years (Goulding and Syed-Khuzzan, 2014). The most prominent criticism relates to KLSI's use of rank ordering, which forces individuals to rank one style higher than another, resulting in a preferred learning style (Kayes, 2005; An and Carr, 2017). This can result in negative correlations between the constructs being measured and cause an inflated validity of the constructs. Some researchers have found that the KLSI has poor test-retest reliability (Henson and Hwang, 2002; Koob and Funk, 2002) and construct validity (Kolb, 1976; Freedman and Stumpf, 1980; Platsidou and Metallidou, 2009). Kolb and Kolb (2013) have revised the learning style inventory six times during the past 40 years to address most of the concerns and criticisms of researchers. According to the creators of KLSI, the latest version, KLSI 4.0, maintains the high scale reliability (external validity) of KLSI 3.1, but offers higher internal validity (Kolb and Kolb, 2013). Many recent publications have continued to make use of KLSI 3.1, as KLSI 4.0 is only available online – apparently because of the complex scoring formula for learning flexibility. As KLSI 4.0 needs to be ordered online, it has become a commercial learning style evaluation instrument; and this might impact its popularity as a learning style instrument for research purposes.

This study made use of a revised version of the RLSI of Manolis *et al.* (2013), who considered the weakness of KLSI and transformed it from a type (categorical measure) to a degree (continuous measure) style of measure. They acknowledged that a learner can possess sub-styles along with their preferred style. The authors claimed that the newly developed measure (with 17 items) is easier to use than KLSI 3.1 (with 48 items) and enables prediction with fewer predictor variables.

In order to reveal the potential link between entrepreneurial experience and preferred learning style, the sample included business students from South Africa ($n = 1032$) and engineering students from Norway ($n = 244$). Among these were 586 males and 690 females; all were enrolled for an entrepreneurship course as a requirement of their degree.

Entrepreneurial experience was measured by posing three Yes/No statements about entrepreneurial experience. They were: A: “Do you currently work in a business owned by

yourself, your spouse or your parents?"; B: "Do you currently run a business you own yourself?"; and C: "Are you currently or have you been involved in a start-up firm (founder or team member)?" These items provided eight groups (2³) of students with a range of entrepreneurial experience. Table 1 indicates the descriptive statistics of the sample and their distribution in the eight groups. In total, 29 students responded "Yes" to all three questions related to previous entrepreneurial experience.

Table 1. Descriptive statistics, n = 1276

Group	A	B	C	N	Male	Female	Engineering Norway Bergen	Business South Africa Pretoria	Business South Africa Stellenbosch
111	Yes	Yes	Yes	29	20	9	4	23	2
112	Yes	Yes	No	13	6	7	3	10	1
121	Yes	No	Yes	11	4	7	1	9	1
122	Yes	No	No	54	25	29	9	36	9
211	No	Yes	Yes	7	3	4	2	3	2
212	No	Yes	No	16	10	6	4	10	2
221	No	No	Yes	68	39	29	16	40	12
222	No	No	No	1078	479	599	205	762	120
<i>n</i>				1276	586	690	244	893	149
A	Do you currently work in a business owned by yourself, your spouse or your parents?								
B	Do you currently run a business you own yourself?								
C	Are you currently or have you been involved in a start-up firm (founder or team member)?								

Manolis *et al.*'s (2013) explorative principal component analysis, which makes use of a 17-item instrument with a structural equation model confirmatory factor analysis, revealed a three-factor solution. This study explored whether four different learning styles (doing, observing, reasoning and feeling/emotions) could be measured by adding an item along the emotion dimension: "I learn best when my emotions are evoked", as indicated in Table 2. Further, "and reactions" was omitted from Manolis *et al.*'s (2013) item, "When I am learning I have strong feelings and reactions", based on a pre-testing with 54 students that revealed that students assign different cognitive content to the "feelings" and "reactions" components of the item. In our survey, a 7-point Likert scale was used, where 1 = "totally disagree" and 7 = "totally agree" for the measure of preferred learning styles; see the items in Table 2. Manolis *et al.*'s (2013) 16 original items, the one adjusted item and the new item were then analysed using a principal component analysis with varimax rotation.

Following the procedure recommended by Hair *et al.* (1998) for model improvement, items with an extraction lower than 0.5 and items with side loadings higher than 0.3 were omitted from further analysis. This resulted in five items for observing, three for doing, three for reasoning and three for emotions. In order to balance the factors, three items per learning style were used, resulting in 12 items, as listed in Table 2. Only a few items per construct are

required, as a higher number of items produces inflated Cronbach's alphas (Goulding and Syed-Khuzzan, 2014). The three selected observing items offered the highest model fit measured by Kaiser–Meyer–Olkin (KMO), as well as the highest explained variance and the highest Cronbach's alpha.

Table 2. Principal component analysis on preferred learning styles, $n = 1276$

Principal component analysis, $n = 1276$ varimax rotation DO* OBS* REA* EMO* Extraction					
I learn by doing	0.765				0.663
I learn best from a chance to try out and practise	0.867				0.824
I learn best when I can try out for myself	0.841				0.794
When I learn I like to watch and listen	0.867				0.792
I learn best when I listen and watch carefully	0.876				0.817
When I learn I like to observe	0.696				0.607
I learn best when I rely on logical thinking		0.873			0.804
When I learn I tend to reason things out		0.648			0.599
When I am learning I am a logical person		0.846			0.792
When I am learning I have strong feelings			0.762	0.675	
I learn by feeling			0.846	0.733	
I learn best when my emotions are evoked			0.792	0.647	
Eigenvalue	4.642	1.633	1.346	1.128	
% of variance	38.7	13.6	11.2	9.4	72.9
Cronbach's alpha	0.839	0.816	0.799	0.762	
KMO					0.829***

Note(s): *Doing (DO), Observing (OBS), Reasoning (REA) and Emotions (EMO)

As shown in Table 2, the principal component analysis among 1,276 students indicated a four-factor solution for preferred learning styles in line with Kolb's (1976) original model: doing (Cronbach's alpha 0.839), observing (Cronbach's alpha 0.816), reasoning (Cronbach's alpha 0.799) and emotions (Cronbach's alpha 0.762).

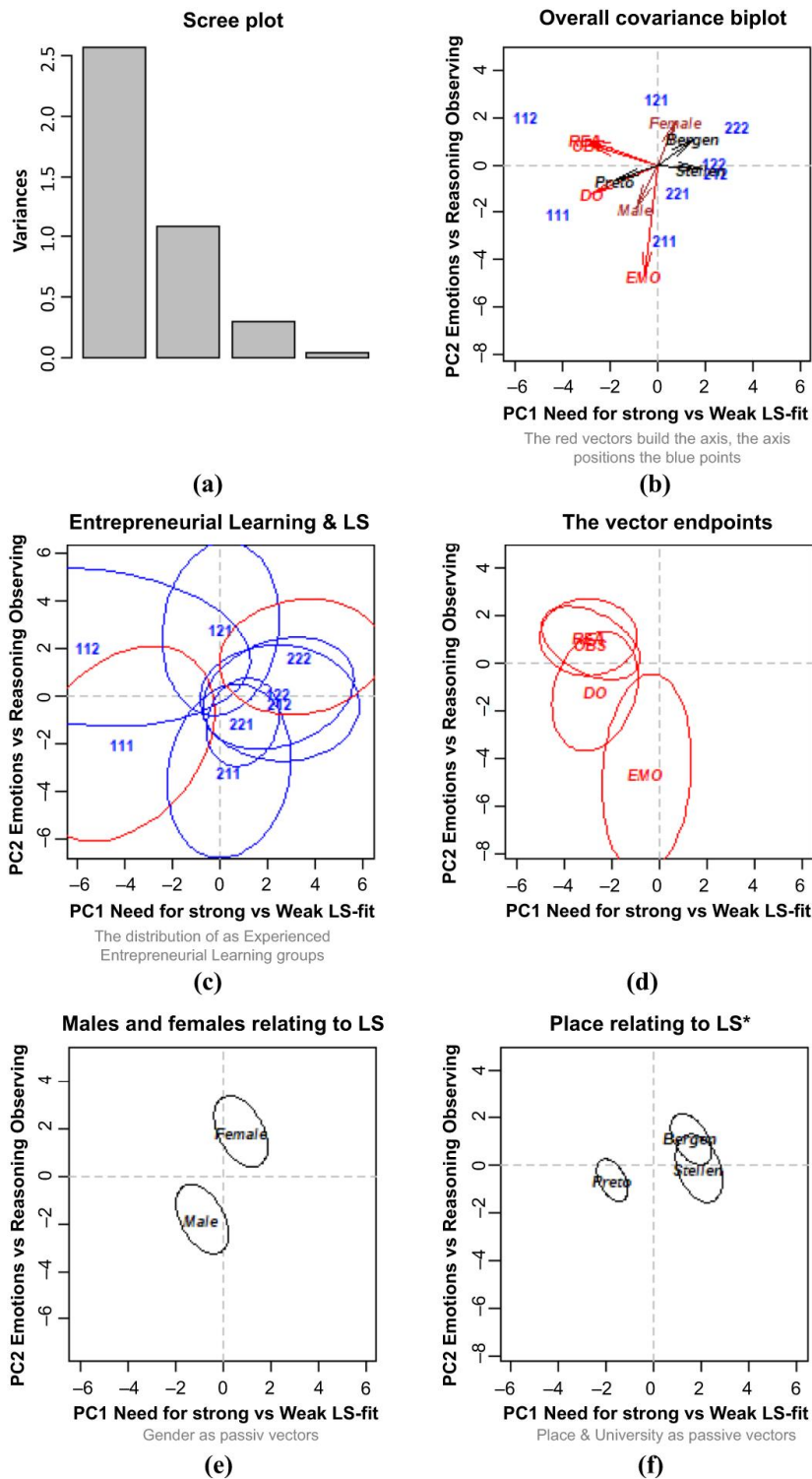
A KMO measure of sampling adequacy of 0.829 is satisfactory (Hair *et al.*, 1998). Moreover, the model explains 72.9% of the variance. The analysis revealed a simpler measure of students' preferred learning styles, comprising a total of 12 items, with three items per learning style. The model fit was supported by the high Cronbach's alphas. The component labels were derived from the nomological content of the items comprising the component and were in line with Kolb's labels.

Data analysis and findings

A summed average of the four preferred learning styles was used to enhance further cross-study comparison. The eight groups with entrepreneurial experience were compared with their preferred learning style doing (DO), observing (OBS), reasoning (REA) or emotions (EMO) – by means of PCrA (Greenacre, 2010). Through PCrA, the eight groups were positioned in a multi-dimensional space by the vectors describing the four preferred learning styles. Bootstrapping ($n = 10.000$) was used to calculate confidence intervals for the position of the eight groups and the preferred learning style vector end points. The groups and the vector end points are different if their confidence intervals do not overlap.

Figure 2(a) shows that a two-dimensional PCrA was recommended, as the eigenvalues for the two dimensions were higher than 1.0. Figure 2(b) offers the overall covariance bi-plot, where the vector end points describe how the preferred learning style positions the eight groups. Figure 2(c) shows the spread in the groups formed by their preferred learning styles. The figure shows that the group that had all three measured entrepreneurial experiences (the “111” group) differed from the group that had none of these entrepreneurial experiences (the “222” group) in how they related to their preferred learning style. Thus, the confidence intervals of the 111 group and the 222 group did not overlap. These confidence intervals are marked red for ease of reading. Figure 2(d) shows how the four learning styles' vector end points relate to each other. For the students who were investigated, the emotions learning style is separated from the doing, observing and reasoning learning styles. Observing and reasoning overlapped almost completely, and these two learning styles overlapped partly with the doing learning style.

The two-dimensional PCrA explains 37% of the variance in preferred learning styles among the eight groups of students, with the x -axis explaining 25% of the variance and the y -axis explaining an additional 12% of the variance. Along the x -axis in Figure 2(d), the learning style vectors point towards the left side of the diagram, which is where the students with more entrepreneurial experience are positioned (see Figure 2(c)). This implies that the students with more entrepreneurial experience tended to provide higher scores on their preferred learning style items than those with less entrepreneurial experience. The difference between the experienced group (“111”) and the group without experience (“222”) was significant, as their significance intervals did not overlap. The distribution along the x -axis shows that the entrepreneurially experienced group were more aware of their preferred learning style than the less entrepreneurially experienced students. The x -axis was then labelled high versus low awareness of preferred learning style. The y -axis shows that students regarded emotions as a learning style distinct from observing and reasoning. The doing learning style partly overlapped both the emotions and the reasoning/observing learning style segments. The y -axis then was labelled emotions versus reasoning/observing.



Note(s): *The students from the University of Pretoria and the University of Stellenbosch are 2nd year business students; the students from the Western Norway University of Applied Science, Bergen are 2nd year engineering students

Figure 2. PCrA: (a) scree plot, (b) overall covariance bi-plot, (c) experienced entrepreneurial learning as a function of learning styles, with 95% confidence intervals, (d) learning styles vector end points with 95% confidence intervals, (e) gender as passive vector in the covariance bi-plot, (f) place as passive vector in the bi-plot

The emotions learning style is positioned in the lower left corner of Figure 2(d), which is where the “111” group is positioned in Figure 2(c). The inexperienced “222” group is positioned at the top of the diagram, and so are the learning styles of reasoning and observing. This implies that emotions as a learning style is more prominent for the students with entrepreneurial experience (the “111” group) than for the entrepreneurially inexperienced group, who relate more to observation or reasoning as their preferred learning style. Emotions, as a learning style, is interpreted as more important for the entrepreneurially experienced “111” group than for the entrepreneurially inexperienced “222” group.

Gender and place are passively regressed into the bi-plot by the preferred learning styles; see Figure 2(e) and (f). Figure 2(e) shows that males and females differed in their preferred learning style. Males are located in the lower left corner of the diagram, where the entrepreneurially experienced group is located, while females are positioned at the top right corner, where the entrepreneurially inexperienced students are located. As the males had more entrepreneurial experience, they were more aware of their preferred learning style. The males seemed to prefer active learning styles (doing and emotions) more than did the females, who preferred observation and reasoning as their learning styles.

Figure 2(f) positions the universities from which the investigated students come. We see that the students' educational background is only marginally linked to their preferred learning style. As the universities are all positioned at the same level along the y-axis, there was no difference about which learning styles were preferred among the students in the three investigated universities. The business students did not differ from the engineering students, and the South African students did not differ from the Norwegian students. This finding supports a study conducted by Joy and Kolb (2009), who found that culture as linked only marginally to learning styles.

Conclusions and implications

Theoretical contributions and further studies

This study contributes to enhancing our understanding of the relationship between entrepreneurial experience and the learning styles of students. In the study, we have assumed conceptually through prior research that past and current entrepreneurial experiences are likely to induce entrepreneurial learning among students. Moreover, this acquired learning is hypothesised to influence students' awareness of and preference for their learning style. Furthermore, we clarify the relationship between entrepreneurial experience and the four learning styles, showing that emotions form a distinct learning modus. The analysis thus shows a clear link between entrepreneurial experience and a preference for emotions as a learning style. This finding contributes new knowledge to bridging the two research streams, admitting the importance of emotions in entrepreneurial experience and affirming emotions as a preferred learning style among students with prior entrepreneurial experience.

The research revised Manolis *et al.*'s (2013) RLSI 17 items to only 12 items, while also making use of a Likert scale to make it a continuous measure, thus overcoming the problem with the categorical measure that was seen as a weakness in KLSI 3.1 (see Methodology section). The study indicates that the students applied four distinct learning styles – observing, doing, reasoning and emotions – in their learning. This finding then supports Kolb (1976) in his four learning styles and not only the three obtained with the RLSI.

The results indicate that males and females related differently to the four learning styles. The male students in our sample also had more entrepreneurial experience than the female students. The male students were also more concerned about their learning style than were the female students. According to Willcoxson and Prosser (1996), educational background and career could influence the gender learning style differences. Thus the difference in learning styles observed between the genders could result from differences in entrepreneurial experience and might not be related only to gender. The Global Entrepreneurship Monitor (GEM, 2018) reported lower early-stage entrepreneurial activity ratios for females than for males in all the countries monitored. The results of our study could contribute to knowledge of the preferred leaning styles of females in order to enhance their entrepreneurial activity.

Previous studies have sought to reveal how demographic variables differentiate between groups of students with differing preferred learning styles. This study has suggested that previous experience is the differentiating factor, not demographics. As experience differentiated the preferred learning styles, this study has tapped into the scholarly discussion about how to understand and apply learning style theories. Two streams of research exist: adjusting the didactics to the students' stable learning style preferences or exploring and extending the students' learning vehicles through pedagogical measures (Pheiffer *et al.*, 2005; Goulding and Syed-Khussan, 2014; Jepsen *et al.*, 2015; Ustav and Venesaar, 2018). The present study supports Kolb (1976) in the dynamic view of learning style preferences.

The study also contributes to establishing a linkage between entrepreneurial learning (developed through entrepreneurial experience) and learning styles. The findings indicated that students with prior and current entrepreneurial experience were more concerned about their learning styles in an educational setting. If all students were aware of their preferred learning styles, they might be encouraged to develop other learning styles, thus enhancing the full learning cycle and strengthening the learning experience.

Qualitative approaches, including in-depth interviews and focus groups with students, would enrich the actual research findings and provide qualitative insights into how students might develop an enhanced awareness of learning styles and how prior experience might influence a preference for a particular learning style.

The clear relationship between entrepreneurial experience and preference for learning style indicates that entrepreneurial experience represents a fundamental and transformational experiential learning process for individuals; and this accords with central entrepreneurial learning theory (e.g. Pittaway and Thorpe, 2012). Even so, consistent with previous research (referred to in Manolis *et al.*, 2013), it is evidently valuable for students to be aware of their primary learning style, since they are more likely to convert their knowledge into practice than students who do not know their learning style. These assumptions should be developed in further studies that investigate how students with prior experience use their prior learning in educational practice compared with inexperienced students and how preferred learning styles change over time, depending on the given learning situation.

This study is only modest initial research into the link between learning styles and entrepreneurial learning. As such, it also contributes to entrepreneurial learning theories. The learner develops a preferred way of choosing between the four learning styles, influenced by their prior knowledge and thus by their entrepreneurial learning. Students with entrepreneurial experience are more concerned about how they learn and want this learning to fit their preferred learning style. If students with entrepreneurial experience have stronger

concerns about how they learn, it appears that they have developed this concern as they have followed their entrepreneurial learning path. If experienced portfolio entrepreneurs also have a stronger concern about how they learn than do novice entrepreneurs, an explanation of the relationship between entrepreneurial learning/experience and preferred learning styles might be closer. However, only further studies using a qualitative approach with a longitudinal design will provide in-depth understanding and yield thorough insight into the entrepreneurial learning process and experiences with learning styles. Qualitative research could investigate how entrepreneurs become aware of their preferred learning styles and whether these preferences change as the entrepreneur accumulates entrepreneurial learning.

Practical implications for entrepreneurship education

As our study shows, entrepreneurial experience has an impact on students' awareness of and preference for learning styles. We can deduce several practical implications of the findings. Overall, educators should consider integrating real entrepreneurial experiences into entrepreneurship education courses, providing all students with entrepreneurial experience and so enhancing their awareness of primary and other learning styles. We therefore propose pedagogical designs that allow for entrepreneurial learning experiences in the curriculum and/or offer extra-curricular courses and arrangements. Pheiffer *et al.* (2005) call for a framework that allows students to take control over their learning process, and we respond to this call with our suggested approach. Entrepreneurship education and pedagogy could then be fuelled by making students more aware of their preferred learning style while also developing other learning styles, allowing them to learn faster and deeper. In courses with a mix of novices and experienced students, such a design could benefit both groups. Students without prior entrepreneurial experience (novices) would have the possibility to work alongside (entrepreneurially) experienced students. The novice students would thus intensify and boost their entrepreneurial learning through peer learning with experienced students. Experienced students, on the other hand, would equally enhance their learning, as they would have to reflect and explain to their novice peers why and how they learn.

Entrepreneurship educators should also employ didactics that allow students to explore and experiment with different learning styles in a variety of learning situations while reflecting on the usefulness of the particular learning style for the individual student. In this way, the student would increase his or her awareness of how he or she learns, thus building capacity for meta-learning. Our study also hints at didactics that evoke emotions to light students' entrepreneurial fire. In designs, therefore, it is important to acknowledge emotions as an integral part of entrepreneurial learning, as suggested by scholars in entrepreneurship education (e.g. Lackéus, 2014; Kurczewska *et al.*, 2018; Kubberød and Pettersen, 2018). As teachers we need to ignite the entrepreneurial spark among students and stimulate their emotions. It is not sufficient for students to develop entrepreneurial skills: they also need to be inspired and to enjoy, commit to and endure the entrepreneurial ride.

Limitations

Qualitative research would add in-depth knowledge of the learning process and more comprehensive insights into how individuals develop an awareness of and preference for learning styles through their entrepreneurial experience. Our measure of entrepreneurial experience could also benefit from further improvements, as it does not measure the length and breadth of the entrepreneurial learning our respondents have experienced from starting, owning and running their businesses. Although the group with entrepreneurial experience

(111) sample size was 29, which is relatively small compared with 1078 for the inexperienced group (222), the analysis method employed overcomes this limitation. PCrA is robust enough to discern differences in sample sizes and allows for small groups (Greenacre and Primicerio, 2013). Even so, the study provides confidence intervals to strengthen its arguments.

References

Aarstad, J., Pettersen, I.B. and Henriksen, K.E. (2016), "Entrepreneurial experience and access to critical resources: a learning perspective", *Baltic Journal of Management*, Vol. 11 No. 1, pp. 89-107.

An, D. and Carr, M. (2017), "Learning styles theory fails to explain learning and achievement: recommendations for alternative approaches", *Personality and Individual Differences*, Vol. 116, pp. 410-416.

Balan, C. and Ionita, D. (2011), "Exploratory research on the organizational learning in small enterprises and implications for the economic higher education", *Amfiteatru Economic*, Vol. 13 No. 30, pp. 464-481.

Baron, R.A. and Ensley, M.D. (2006), "Opportunity recognition as the detection of meaningful patterns: evidence from comparisons of novice and experienced entrepreneurs", *Management Science*, Vol. 52 No. 9, pp. 1331-1344.

Buch, K. and Sena, C. (2001), "Accommodating diverse learning style in the design and delivery of on-line learning experiences", *International Journal of Engineering Education*, Vol. 17 No. 1, pp. 93-98.

Claxton, C.S. and Murrell, P.H. (1987), "Learning styles: implications for improving educational practices", ASHE-ERIC Higher Education Report No. 4, Association for the Study of Higher Education, Washington, DC, p. 116, available at: <https://files.eric.ed.gov/fulltext/ED293478.pdf>.

Cope, J. (2003), "Entrepreneurial learning and critical reflection: discontinuous events as triggers for 'higher-level' learning", *Management Learning*, Vol. 34 No. 4, pp. 429-450.

Cope, J. (2011), "Entrepreneurial learning from failure: an interpretative phenomenological analysis", *Journal of Business Venturing*, Vol. 26 No. 6, pp. 604-623.

Cope, J. and Watts, G. (2000), "Learning by doing – an exploration of experience, critical incidents and reflection in entrepreneurial learning", *International Journal of Entrepreneurial Behavior and Research*, Vol. 6 No. 3, pp. 104-124.

De Bello, T.C. (1990), "Comparison of eleven major learning styles models: variables, appropriate populations, validity of instrumentation, and the research behind them", *Reading, Writing, and Learning Disabilities*, Vol. 6 No. 3, pp. 203-222.

Demirbas, O.O. and Demirkan, H. (2007), "Learning styles of design students and the relationship of academic performance and gender in design education", *Learning and Instruction*, Vol. 17 No. 3, pp. 345-359.

Dew, N., Read, S., Sarasvathy, S.D. and Wiltbank, R. (2009), "Effectual vs predictive logics in entrepreneurial decision-making: differences between experts and novices", *Journal of Business Venturing*, Vol. 24 No. 4, pp. 287-309.

Dunn, R. and Dunn, K. (1999), *The Complete Guide to the Learning Styles Inservice System*, Allyn and Bacon, Boston, MA.

Dunn, R. and Griggs, S. (2000), *Practical Approaches to Using Learning Styles in Higher Education*, Bergin, Westport, CT.

Foo, M.D., Uy, M.A. and Baron, R.A. (2009), "How do feelings influence effort? An empirical study of entrepreneurs' affect and venture effort", *Journal of Applied Psychology*, Vol. 94 No. 4, pp. 1086-1094.

Freedman, R.D. and Stumpf, S.A. (1980), "Learning style theory: less than meets the eye", *Academy of Management Review*, Vol. 5 No. 3, pp. 445-447.

GEM (2018), *Global Entrepreneurship Monitor 2017*, Global Entrepreneurship Research Association (GERA), Boston.

Gemmell, R.M. (2017), "Learning styles of entrepreneurs in knowledge-intensive industries", *International Journal of Entrepreneurial Behavior and Research*, Vol. 23 No. 3, pp. 446-464.

Goulding, J. and Syed-Khuzzan, S. (2014), "A study on the validity of a four-variant diagnostic learning styles questionnaire", *Education + Training*, Vol. 56 Nos 2-3, pp. 141-164.

Greenacre, M. (2010), *Bi-plots in Practice*, Fundacion BBVA, Barcelona.

Greenacre, M. and Primicerio, R. (2013), *Multivariate Analysis of Ecological Data*, Fundacion BBVA, Barcelona.

Hair, J.F. Jr, Anderson, R.E., Tatham, R.L. and Black, W.C. (1998), *Multivariate Data Analysis*, 5th ed., Prentice Hall, New Jersey, NJ.

Hayton, J.C. and Cholakova, M. (2012), "The role of affect in the creation and intentional pursuit of entrepreneurial ideas", *Entrepreneurship: Theory and Practice*, Vol. 36 No. 1, pp. 41-67.

Henson, R.K. and Hwang, D.Y. (2002), "Variability and prediction of measurement error in Kolb's learning style inventory scores: a reliability generalization study", *Educational and Psychological Measurement*, Vol. 62 No. 4, pp. 712-727.

Hilgersom-Volk, K. (1987), "Celebrating students' diversity through learning styles", *OSSC Bulletin*, Vol. 30 No. 9, pp. 1-39.

Honig, B. and Hopp, C. (2019), "Learning orientations and learning dynamics: understanding heterogeneous approaches and comparative success in nascent entrepreneurship", *Journal of Business Research*, Vol. 94 No. 1, pp. 28-41.

Jepsen, D.M., Varhegyi, M.M. and Teo, S.T. (2015), "The association between learning styles and perception of teaching quality", *Education + Training*, Vol. 57 No. 5, pp. 575-587.

Joy, S. and Kolb, D.A. (2009), "Are there cultural differences in learning style?", *International Journal of Intercultural Relations*, Vol. 33 No. 1, pp. 69-85.

Kakouris, A., Fulford, H. and Liargovas, P. (2015), "Matching experiential learning style with entrepreneurial opportunities: a framework", *Proceedings of the European Conference on Innovation and Entrepreneurship*, 2015 January, ECIE, Academic Conferences and Publishing, Sonning Common, pp. 836-839.

Kayes, D.C. (2005), "Internal validity and reliability of Kolb's learning style inventory version 3 (1999)", *Journal of Business and Psychology*, Vol. 20 No. 2, pp. 249-257.

Kolb, A.Y. and Kolb, D.A. (2008), "Experiential learning theory: a dynamic, holistic approach to management learning, education and development", in Armstrong, S.J. and Fukami, C.V. (Eds), *Handbook of Management Learning, Education and Development*, SAGE, Los Angeles, pp. 42-68.

Kolb, A.Y. and Kolb, D.A. (2013), *The Kolb Learning Style Inventory 4.0. A Comprehensive Guide to the Theory, Psychometrics, Research on Validity and Educational Applications*, Hay Group, Philadelphia, PA.

Kolb, D.A. (1976), "Management and the learning process", *California Management Review*, Vol. 18 No. 3, pp. 21-31.

Kolb, D.A. (1984), *Experiential Learning: Experience as the Source of Learning and Development*, Vol. 1, Prentice-Hall, Englewood Cliffs, NJ.

Koob, J.J. and Funk, J. (2002), "Kolb's learning style inventory: issues of reliability and validity", *Research on Social Work Practice*, Vol. 12 No. 2, pp. 293-308.

Kubberød, E. and Pettersen, I.B. (2018), "The role of peripherality in students' entrepreneurial learning", *Education + Training*, Vol. 60 No. 1, pp. 2-15.

Kurczewska, A., Kyrö, P., Lagus, K., Kohonen, O. and Lindh-Knuutila, T. (2018), "The interplay between cognitive, conative, and affective constructs along the entrepreneurial learning process", *Education + Training*, Vol. 60 Nos 7-8, pp. 891-908.

Lackéus, M. (2014), "An emotion based approach to assessing entrepreneurial education", *International Journal of Management in Education*, Vol. 21 No. 3, pp. 374-396.

Loo, R. (1999), "Confirmatory factor analysis of Kolb's learning style inventory (LSI-1985)", *British Journal of Educational Psychology*, Vol. 69 No. 2, pp. 213-219.

Manolis, C., Burns, D.J., Assudani, R. and Chinta, R. (2013), "Assessing experiential learning styles: a methodological reconstruction and validation of the Kolb Learning Style Inventory", *Learning and Individual Differences*, Vol. 23 No. 1, pp. 44-52.

- Minniti, M. (2010), *The Dynamics of Entrepreneurial Activity*, Oxford University Press, Oxford.
- Muehlfeld, K., Urbig, D. and Weitzel, U. (2017), "Entrepreneurs' exploratory perseverance in learning settings", *Entrepreneurship: Theory and Practice*, Vol. 41 No. 4, pp. 533-565.
- Pacalo, C.A. (2014), *Learning Style and Entrepreneurial Operations: A Small Business Research Study*, Doctoral dissertation, Virginia Polytechnic Institute and State University, Falls Church, VA.
- Pheiffer, G., Holley, D. and Andrew, D. (2005), "Developing thoughtful students: using learning styles in an HE context", *Education + Training*, Vol. 47 No. 6, pp. 422-431.
- Piaget, J. (1970), *Structuralism*, Basic Books, New York, NY.
- Pittaway, L. and Thorpe, R. (2012), "A framework for entrepreneurial learning: a tribute to Jason Cope", *Entrepreneurship and Regional Development*, Vol. 24 Nos 9-10, pp. 837-859.
- Platsidou, M. and Metallidou, P. (2009), "Validity and reliability issues of two learning style inventories in a Greek sample: Kolb's learning style inventory and Felder and Soloman's index of learning styles", *International Journal of Teaching and Learning in Higher Education*, Vol. 20 No. 3, pp. 324-335.
- Podoyntsina, K., Van der Bij, H. and Song, M. (2012), "The role of mixed emotions in the risk perception of novice and serial entrepreneurs", *Entrepreneurship: Theory and Practice*, Vol. 36 No. 1, pp. 115-140.
- Politis, D. (2005), "The process of entrepreneurial learning: a conceptual framework", *Entrepreneurship: Theory and Practice*, Vol. 29 No. 4, pp. 399-424.
- Rae, D. (2006), "Entrepreneurial learning: a conceptual framework for technology-based enterprise", *Technology Analysis and Strategic Management*, Vol. 18 No. 1, pp. 39-56.
- Robson, P., Akuetteh, C., Stone, I., Westhead, P. and Wright, M. (2013), "Credit-rationing and entrepreneurial experience: evidence from a resource deficit context", *Entrepreneurship and Regional Development*, Vol. 25 Nos 5-6, pp. 349-370.
- Smilor, R.W. (1997), "Entrepreneurship: reflections on a subversive activity", *Journal of Business Venturing*, Vol. 12 No. 5, pp. 341-346.
- Toms, W.M. (2007), *Exploring the Relationship between Kolb's Learning Styles and TLP Leadership Styles in the New Jersey State Police: A Correlation Study*, Doctoral Dissertation, George Washington University, Washington DC.
- Ustav, S. and Venesaar, U. (2018), "Bridging metacompetencies and entrepreneurship education", *Education + Training*, Vol. 60 Nos 7-8, pp. 674-695.
- Vincent, A. and Ross, D. (2001), "Personalize training: determine learning style, personality types and multiple intelligence", *The Learning Organization*, Vol. 8 No. 1, pp. 36-43.

Wang, C.L. and Chugh, H. (2014), "Entrepreneurial learning: past research and future challenges", *International Journal of Management Reviews*, Vol. 16 No. 1, pp. 24-61.

Willcoxson, L. and Prosser, M.T. (1996), "Kolb's Learning Style Inventory (1985): review and further study of validity and reliability", *The British Journal of Educational Psychology*, Vol. 66 No. 2, pp. 247-257.

Yousef, D.A. (2018), "Learning style preferences of undergraduate students: the case of the American University of Ras Al Khaimah, the United Arab Emirates", *Education + Training*, Vol. 60 No. 9, pp. 971-991.