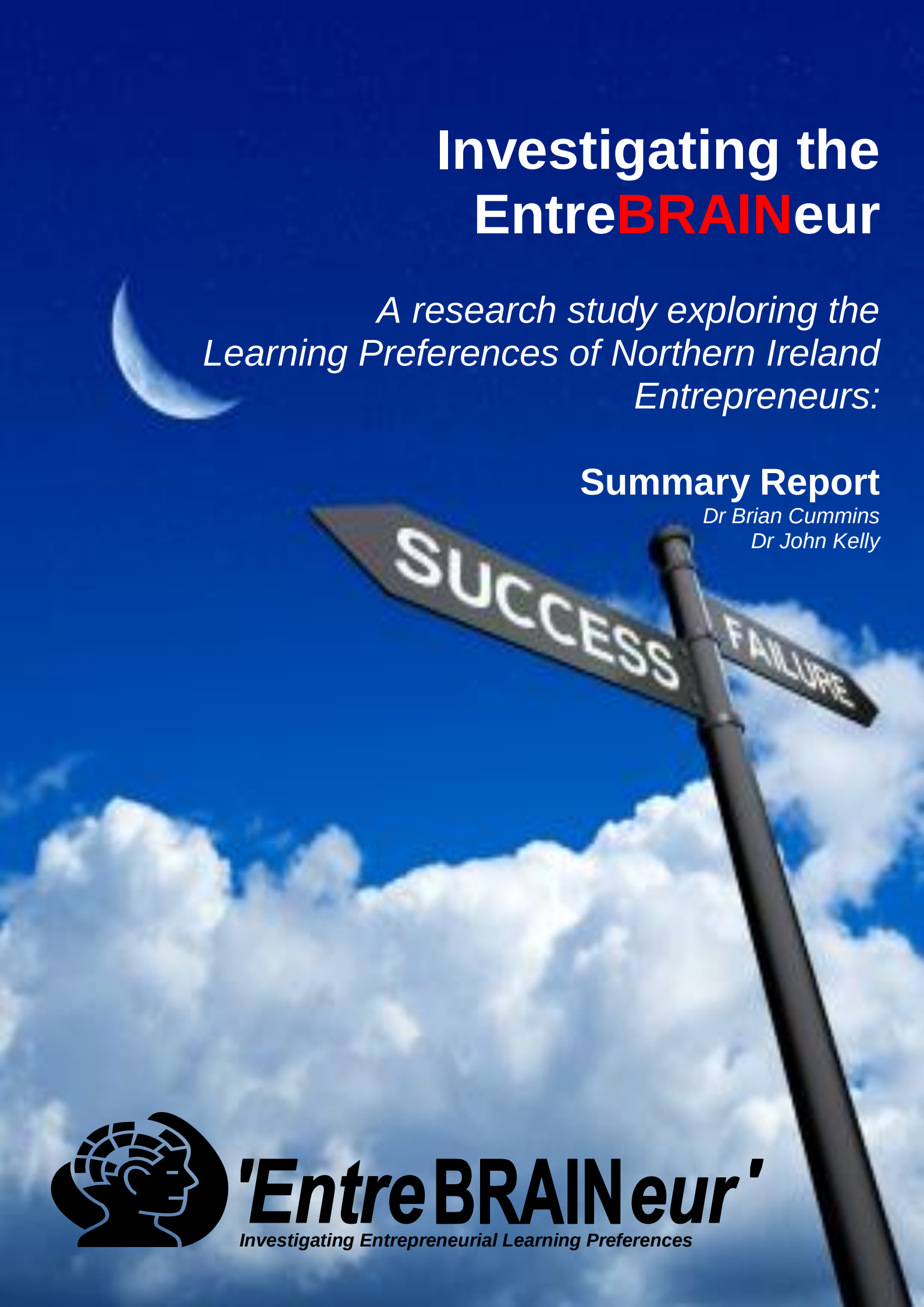
Investigating the EntreBRAINeur

A research study exploring the Learning Preferences of Northern Ireland Entrepreneurs:

Summary Report

Dr Brian Cummins
Dr John Kelly



'EntreBRAINeur'
Investigating Entrepreneurial Learning Preferences

Summary Report
October 2010

A study commissioned and funded by

Invest Northern Ireland

&

The Department of Employment and Learning

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A College of Queen's University Belfast
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We would like to express our thanks to Denise Robotham for transcribing the interviews.

Abstract

'I'd be happy to give you entrepreneurial thinking – what are the guidelines?

The following small-scale research study was undertaken by Dr John Kelly of Fingerprint Learning and Dr Brian Cummins of Stranmillis University College Belfast. Funding was provided by Invest NI and The Department of Employment and Learning (DEL) to investigate if any pattern of *Learning Preference* exists amongst Northern Ireland entrepreneurs. The rationale behind the study was that while the matching of the learning environment to an individual's learning preferences has generated popular appeal within all sectors of education (although not without criticism), this has not been considered in relation to entrepreneurial learning. If it is accepted that one objective of formal educational provision is to foster entrepreneurship, then it follows that there is value in exploring the learning preferences of successful entrepreneurs to establish if the traditional system of education promotes or hinders entrepreneurial skills and capabilities – and if so, what we should do about it.

It must be noted that this is potentially a huge area of research and the writers in this case have simply scratched the surface of it. This was due to the fact that it was a small-scale explorative study, undertaken within both tight financial and time constraints. It is, therefore, essentially a pilot study that could be used as a basis for a more in-depth analysis of the core theme and emerging areas. This said, the findings are ground breaking and do raise very significant questions concerning how we might, as a society, better educate for entrepreneurship.

The researchers based their analysis on an investigation of 'Right and Left Brain Learning preferences' and 'Mental Styles' amongst a sample of 55 Northern Ireland entrepreneurs. This report will clearly demonstrate that amongst the chosen sample, Right Brained dominance and Concrete Random thinking was the norm, and this is most visible as non-conformity. Crucially, this non-conformist pattern of thinking is the polar opposite of what is valued in traditional educational provision and much of the public sector, which value and reward conformity. The findings of this study suggest that in order to establish an enterprise culture in Northern Ireland, Right Brained Dominance must be valued as the spark for entrepreneurship, supported by those who can ensure that the crucial details are in place, i.e. those who display Left Brained Dominance. In addition to the text and charts presented in this summary report, the key findings are also presented diagrammatically at the end of this report.

By linking learning preferences to entrepreneurship, this report goes some way to helping us not only to understand what forms the catalyst for entrepreneurship but, crucially, what education can do to support potential and existing entrepreneurs.

N.B. For a more detailed discussion on the findings of this research, reference should be made to the 'Full Research Report' for this study.

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1.0 Background Context

'It is widely accepted that the future prosperity of post-industrial societies depends on the strength of their entrepreneurial culture. Consequently many have focused on studying, benchmarking and revitalising local, regional, and national entrepreneurial spirit and competence … entrepreneurship has become a rapidly expanding academic discipline, focused on achieving an understanding of what it takes to develop a successful entrepreneur and on providing good entrepreneurial education' (Heeboll, 1997).

The Northern Ireland Executive in their 'Programme for Government 2002' spelt out the need for, 'the promotion of entrepreneurship … to contribute to the development of a competitive economy … [and the] creation of a, 'culture and environment which supports and encourages enterprise and entrepreneurial activity' (Programme for Government 2002, NI Executive). An enterprise culture includes 'for-profit' venture creation, social entrepreneurship and, intrapreneurship within existing organisations. Northern Ireland's economic blueprint, *'Strategy 2010'* (March 1999) advocated nothing less than a culture change in businesses and society at large, and that:

'Northern Ireland needs a culture which generates a common commitment to economic success based on inclusive and effective partnership; that honours entrepreneurs and encourages others to emulate them' (Ibid.).

One way to get others to emulate entrepreneurs is through education and since the 1980s Northern Ireland has witnessed numerous enterprise education initiatives within both compulsory and post compulsory education. By and large these were generally optional, extra-curricular activities rather than core, fundamental curriculum elements. Recognising that a more formal integration of enterprise/entrepreneurship was needed within educational provision, the strategic 'Entrepreneurship and Education Action Plan', was published by the Department of Enterprise, Trade and Investment NI (March 2003). This provided an agreed framework whereby every student in NI would experience entrepreneurship from primary through to higher and further education. In the Invest NI Corporate Plan 2008-2011 a joined up approach to entrepreneurship education is clear in that Invest NI will 'liaise with DETI, DEL and DE to ensure that entrepreneurship is embedded effectively at all levels of the education system'.

The current NI school curriculum has recently been radically revised (phased in from September 2007) to ensure that all pupils develop the *personal qualities, skills, knowledge, understanding* and *attitudes* as a strong foundation for lifelong learning and work in a rapidly changing economic environment. *Education for Employability* is an entitlement for *ALL* pupils in this curriculum and crucially this includes *Enterprise and Entrepreneurship* as a *statutory component.*

At Further Education Level, the Association of Northern Ireland Colleges (ANIC) has stated a clear intention to 'embed enterprise and entrepreneurship within further education' and numerous initiatives are in place. The Northern Ireland Centre for Entrepreneurship' (NICENT) is led by the University of Ulster in partnership with Queen's University Belfast. NICENT aims to drive, promote and support entrepreneurship in Higher Education in Northern Ireland and to embed a culture of entrepreneurship within Higher Education.

Today, the importance of promoting enterprise at all levels within education is undisputed. In practice much entrepreneurship education largely focuses on providing insights into the business skills necessary to succeed at establishing and running a business. They also typically incorporate competitions to enable participants to practice being enterprising and to communicate their ideas to others.

However, while insights into entrepreneurship through, for example competitions and role modelling are essential to raise the profile of entrepreneurship as a viable career option, arguably they remain perceived as additional, on the fringes of the traditional 'core business' of education – the courses students follow. Yet, as far back as 1989, OECD recognised that the fostering of enterprise and entrepreneurship should not be through additional elements within a programme of education, but rather be integral to good teaching and learning, '*.... enterprise does not depend on a totally new curriculum but rather a new pedagogical process within existing subjects' (OECD, 1989).*

With this in mind, this study has considered the pedagogical approach associated with 'learning preferences', popular in contemporary education practice, and combined it with a study of entrepreneurship to investigate the pattern of *learning preference* amongst Northern Ireland entrepreneurs. Research investigating the *traits* of entrepreneurs is well documented, however insights into entrepreneurial learning preferences is largely absent. Having experience in both enterprise education and learning preferences the researchers felt that a study establishing the relationship between both could offer a valuable contribution to the ongoing 'benchmarking' entrepreneurship.

2.0 Learning Preferences

The concept of individualized "learning styles" emerged during the 1970s, and gained increased popularity in recent years. It differs from ability in that one learning style is not presumed to be better than another (Messick, 1994). ***Right and left hemispheric dominance (also known as lateralisation)*** is one of the most fundamental categories of learning preferences. It is based on the theory that each of the cerebral hemispheres 'works' in different and complementary ways. While both hemispheres are involved in learning, different preferences in learning are associated with the dominance of one hemisphere over another:

The left hemisphere is associated with 'part-to-whole' thinking. Information is processed 'logically' and 'sequentially'. Focuses on detail.

The right hemisphere is associated with 'whole-to-part' thinking. Information is processed 'holistically' or 'globally'. 'Big picture' focus.

Left Hemisphere	Right Hemisphere
Focused attention	Generalised attention
Sequential thinking	'Random' thinking
Predictability	Possibility
Details	Big picture
Conforming	Non-conforming
Reflective	Impulsive
Logical	Intuitive
Abstract	Contextualised

The work of Dunn and Dunn (1978) has been instrumental in enquiring if individuals have left brain tendencies (sequential learners) or exhibit right brain tendencies (simultaneous learners). While most individuals have a distinct preference for one of these styles of thinking, some are more whole-brained and equally adept at both modes. Crucially however:

Traditionally, education has generally tended to favour left-brain modes of thinking, while downplaying the right-brain ones.

Traditionally, in school, left-brain subjects focus on logical thinking, analysis, and accuracy. On the other hand, right-brained subjects focus on aesthetics, feeling, and creativity. Anyone who has been to school will only be too aware of which are considered as being of most value/importance.

2.1 Gregorc's Mind Styles

Anthony Gregorc suggests that children and adults display four categories of thinking style, with most people displaying a dominance of one or two over the others and a preference for one. Gregorc proposes that all individuals display perceptual abilities that can be considered as:

Concrete: Registering information directly through the five senses, dealing with the "here and now."

Abstract: Looking beyond "what is" to the more subtle implications.

In addition Gregorc also introduces Ordering Ability. He suggests the following ordering process:

Sequential: The mind organises information in a linear, step-by-step manner. A plan is often followed, rather than relying on impulse.

Random: The mind organises information by piece, and in no particular order. The same result is obtained, although skips in a procedure may be evident. Working backwards is not unusual. This person is more impulsive rather than planned.

Gregorc's Mental Styles were selected for this research for the following reasons:

a. It provides descriptions of characteristics that can be interpreted in educational contexts.
b. The Gregorc Mental Style Delineator is an externally published instrument for collecting data.
c. The use of Gregorc's Mental Styles was encouraged in the Department of Education and Skills publication on Learning Styles (Unit 19 Learning Styles 09-2004).

2.2 Criticisms of Learning Preferences

It is important to acknowledge that there are critics of the learning styles approach who almost exclusively suggest that any claim that humans have individual learning preferences is flawed as there is limited, *'independent, critical, longitudinal and large-scale studies with experimental and control groups to test the claims for pedagogy'* (Coffield et al. 2004). The critics do not necessarily view learning styles theory as **wrong** *per se*, it is just that they feel that it has not been proved to be **right** on the basis of rigorous tests, categories, classifications, experimental and control groups.. Until learning styles are **'proved'**, critics question their value and view a learning styles approach as too expensive to administer.

In practice, however, this can be as simple as varying the delivery and content of lessons to meet with a variety of preferred learning styles. Crucially pupils are then provided with opportunities to develop their less dominant styles. In their experience of engagement with a range of learners, and on reflection of their personal

experiences of education, the writers of this report have observed undisputable benefits in the application of learning styles theory and perhaps alarmingly, the shortcomings of a left brain dominated system. The vast majority of critics of the learning styles approach are perhaps more likely to be left brain dominant and can see little fault with the traditional approaches to education. After all, this is a system which served them well. On the flip side, there appears a dearth of insight from the critics regarding what they would advocate, beyond the left brain dominated status quo, as an optimum system of education.

Crucially, none of the entrepreneurs who participated in this study questioned the value of the learning preferences approach. Rather, their positive support was unanimous and many were highly vocal in suggesting that it provided them, for the first time, with an understanding of the realities of their own learning journey and explained their relationship with formal educational provision.

3.0 The Research Methodology

The study employed a quantitative and qualitative approach to data collection involving learning styles questionnaires completed in the presence of the researcher, in conjunction with a semi-structured interview. The interview collected information on the educational and enterprise background of each entrepreneur. The qualitative dimension was important as human attitude and behaviour is difficult to measure using only quantitative tools. While this study has used lateralisation theory terms and categories to describe characteristics that relate to learning preferences:

1. *The results do not endorse or prove lateralisation theory, nor has it been the intention to do so.*

2. *The concepts, terms and categories of lateralisation have been employed throughout the Methodology, Findings, Implications and Recommendations. However, the data and its applications do not, of necessity, depend on this theory, or the conclusions of neuroscience used to assert it.*

3. *The data and the questions used to gather it could conceivably be described in different concepts, terms and categories without altering their relevance to learning preferences.*

3.1 The Research Sample

The research sample consisted of those who were acknowledged as being representative of Northern Ireland entrepreneurs, including Invest NI's entrepreneur 'Hall of Fame'. The categories of respondents included:

- Commercial entrepreneurs (n – 47)
- Female entrepreneurs (also included in the above categories) (n – 13)
- Social entrepreneurs (n – 10)
- Young entrepreneurs (under 35 years old) (n – 8)

3.2 The Research Tools

Background information on the entrepreneur interview participants was gathered under the following headings:

Educational background

- Schools, colleges, universities attended, academic achievement and other qualifications.
- Their personal view of what contribution their primary or secondary education made to their entrepreneurial success and how much it influenced them towards enterprise.

Business background

- Any family background of enterprise.
- Significant influences towards enterprise in their lives.
- Their enterprise history.
- Motives for getting involved in enterprise as a career.

The research set out to measure learning preferences by using the following instruments:

1. *A questionnaire identifying right and left hemisphere dominance.*
2. *Gregorc's Mind Styles Questionnaire.*
3. *A questionnaire on Enterprise Success Factors.*
4. *Learning Preferences in school.*

The actual questions used in interviews are set out in the full research report. In summary, they included:

1. Primary Questions: *These focused on characteristics that are more obviously 'whole-to-part' and holistic, or 'part-to-whole' and analytic. They included questions that were in simultaneous and sequential categories and reflective and impulsive categories.*

2. Secondary Questions: *These focused on factors that have been identified with lateralisation, but are less general than the Primary questions.*

During the interviews:

- The Participants were invited to respond Yes or No to each question.
- No prior explanation was given about right or left hemisphere theory.
- A Yes or No answer could be given to any question. Thus, a Yes answer could be given to a question that related to a left hemisphere characteristic and a Yes answer also given to the corresponding right hemisphere question of the pair.

Thus the participant was not asked to choose between each question in the pair to the exclusion of the other. This allowed for both left and right characteristics to be identified in any person, which could indicate no 'preference' for using one hemisphere over the other.

3.3 Enterprise Success Factors

This questionnaire asked participants to identify personal abilities that contributed to their entrepreneurial success. These questions involved abilities associated with right and left hemisphere dominance, although this was purposely not evident to the participant. The entrepreneurs were asked to indicate the significance of the ability described in each question - each had 3 options: ***1.Very Significant, 2. Significant, 3. Not Significant.*** These results were recorded and presented to show which of the characteristics the entrepreneurs themselves considered important. This provided a means of demonstrating if there was a prevalence of right or left hemisphere dominance in the entrepreneurs.

3.4 Characteristics in school

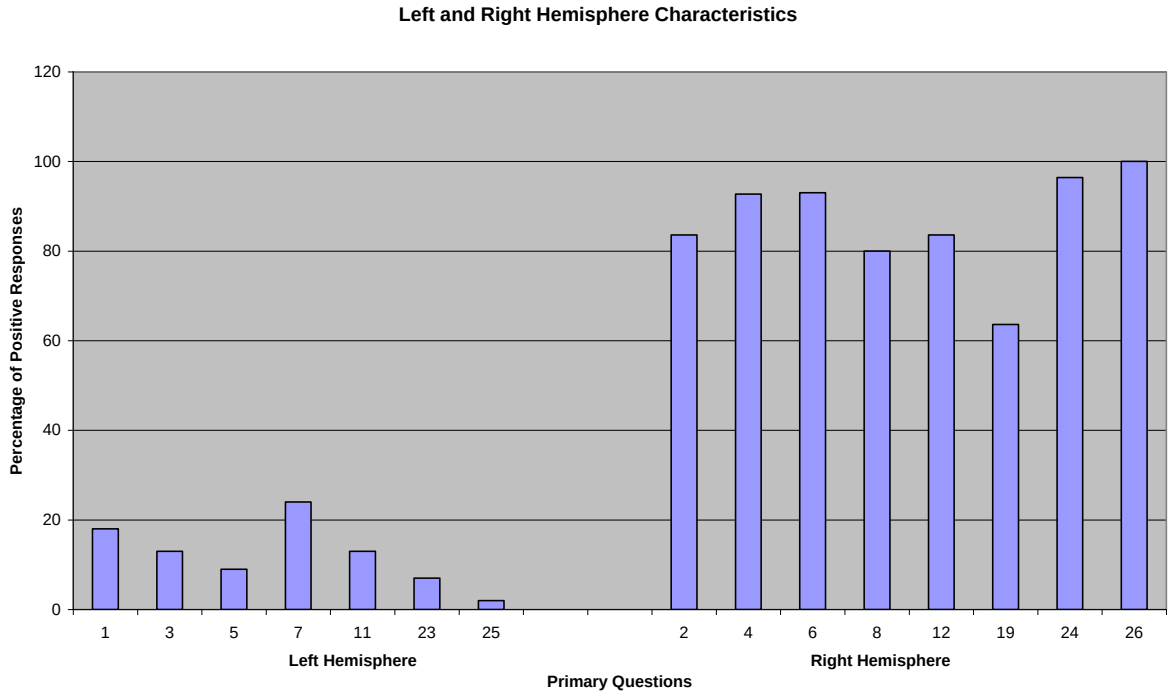
Participants were asked to identify personal characteristics they could recall from their time at school. This was undertaken by recording their responses to verbal questioning of 28 possible preferences that they were aware of during their primary and post-primary education.

4.0 The Research Findings

The following pages provide a selection of the findings that emerged from the implementation of this methodology - These findings are obviously more comprehensively presented in the full research report. For information, the questions associated with the chart are included. N.B. The learning preference terminology used in the charts is explained in the full report.

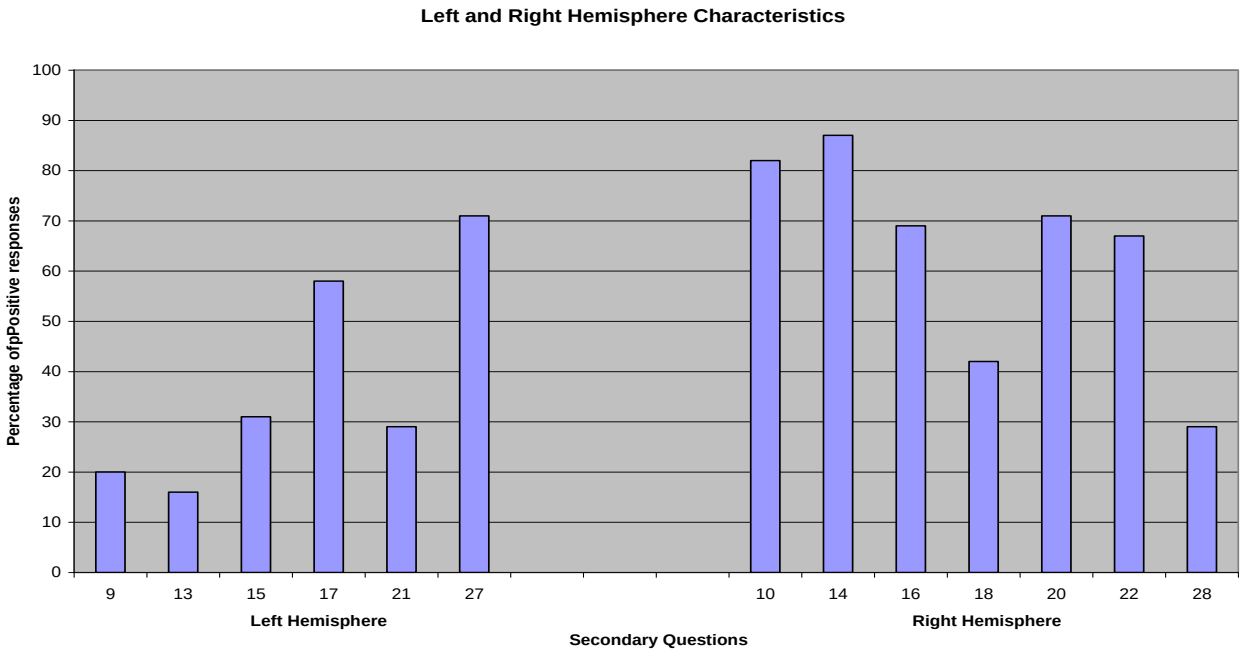
4.1 Questions associated with Hemisphere Dominance

The Chart below shows the positive responses to the **Primary Questions** in the Sequential and Simultaneous categories in percentages.



Questions	
Left	***Right***
Q1 I like to be given clear instructions about what I am expected to do before I start to do it.	*Q2 I prefer to be given a general idea about what I am expected to do.*
Q3 I am careful and quite fussy about being sure how to do something the right way.	*Q4 I am interested in 'seeing the big picture' of what I am involved in i.e. the wider aims.*
Q5 I am more interested in knowing how I should do something than why I am doing it.	*Q6 I need to know why I should do something and need to understand the purpose for doing it*
Q7 I get frustrated by vague and unclear instructions about what I am expected to do.	*Q8 I am frustrated by long, detailed explanations once I have got the general idea.*
Q11 I rarely question the accepted reasons for doing something.	*Q12 I often question ways of doing things that are usually accepted by other people.*
Q23 I prefer to do one task at a time and am stressed by doing two or three tasks at one time.	*Q19 I treat rules just as guidelines and may bend or stretch them to suit my aims.*
Q25 I am happy to be told exactly what I should be doing and how to do it.	*Q24 I like to be involved in more than one task at a time.*
	Q26 I like to be given options about how to do a task and not just one way.

The above results indicate the prevalence of Right Hemisphere Characteristics in the sample and the chart that follows shows the responses to the Secondary Questions in the Sequential and Simultaneous categories in percentages.



Questions	
Left	***Right***
Q9 I like to make lists of tasks and then do them in the order on the list.	*Q10 If I make a list of tasks, I don't do them in order. I may do tasks not on my list instead.*
Q13 I fit myself and my priorities around what is expected by others and what is 'right'.	*Q14 I try to get others to fit in around me and my ideas and what I want to do.*
Q15 I keep a tidy room and working area with everything in its place.	*Q16 I tend to 'spread out' over a wide area of a desk or a room when I work.*
Q17 I am good at estimating the time for a task and keeping to a pre-set time.	*Q18 I underestimate the time it will take to accomplish a task.*
Q21 I like to be involved in putting a plan into practice if I am given clear instructions.	*Q20 When I have the 'gist' of what someone is saying I stop concentrating on what they say.*
Q27 I am good at budgeting and keeping control over money.	*Q22 I like to help in planning something – but not necessarily to put the plan into practice.*
	Q28 I am not good at budgeting and am random and disorganised in controlling money

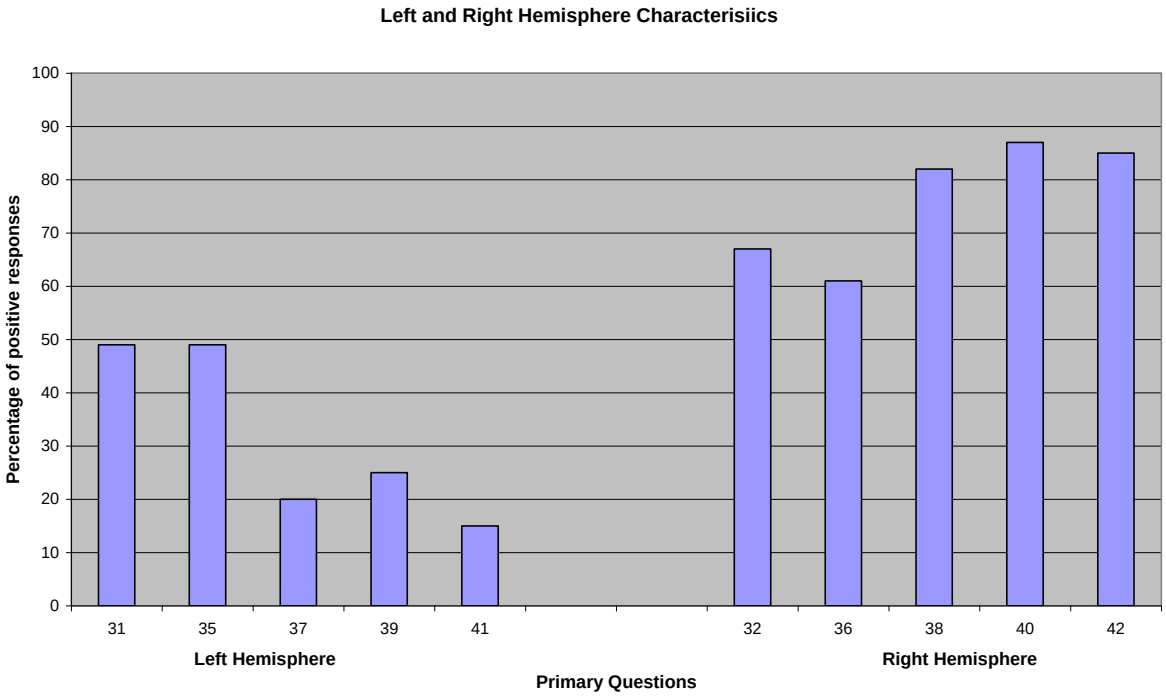
There was a prevalence of 'random' features that have been associated with the right hemisphere and the non-conforming characteristic of entrepreneurs *(Q14 I try to get others to fit in around me and my ideas and what I want to do).* The exceptions are two questions identified as characteristics usually associated with the left hemisphere, and 'non-random' thinking:

- Q17 shows nearly 60% had a good awareness of time.
- Q27 shows that over 70% were good at controlling finance and budgeting. This would generally be considered a *left hemisphere ability*, but is obviously a vital ability for success in venture creation.

In terms of lateralisation this finding would suggest a development of a left hemisphere ability in a right dominant individual who is motivated to use this ability to succeed. Lateralisation theory suggests that when sufficiently motivated, a person who has a 'natural' learning preference will engage in developing their less dominant learning preference when sufficiently motivated to do so. For someone who is more right hemisphere dominant, the awareness of the 'big picture' of business success could be the motivation to engage in the sequential tasks involved in finance and budgeting. This result would indicate that entrepreneurial success can require both hemispheres to be engaged, and learning preferences should not be viewed as 'fixed' positions.

4.2 Reflective and Impulsive Thinking

The chart below shows the positive responses to Primary Questions in the Reflective and Impulsive categories.



Questions	
Left	***Right***
Q31 I like time to think over something and consider the options before making a decision.	*Q32 I think quickly and don't need much time before making a decision or taking action.*
Q35 I hesitate to answer a question or give an opinion without careful thought.	*Q36 I often answer a question or give my opinion without thinking about it for long.*
Q37 I am reluctant to step out and do something unless I am sure of what will happen.	*Q38 I am willing to have a go and try something without being sure of what will happen.*
Q39 I reach conclusions by careful thought and building up to a clear decision.	*Q40 I often think of something 'out of the air' and have an 'instinct' for a way forward.*
Q41 I try to conform to what is expected of me by others.	*Q42 I don't always conform but often question and challenge what others say, or want me to do.*

The results above display the prevalence of intuitive and 'impulsive' thinking in entrepreneurs rather than reflective thinking. The high prevalence of 'instinctive' thinking and challenging others is striking (Q40, 42 over 80%). However two characteristics usually associated with the left hemisphere, Q's 31 & 35 had almost 50% positive responses. Again these appear to be relevant to entrepreneurial success. This complements existing research into the traits of entrepreneurs which has found that while they are willing to take risks, they take 'calculated' risks and not careless ones. Two questions are often associated with right hemisphere characteristics and are shown below:

Left	*Right*
*Q33 When I get a new gadget I always read the instructions first **16%**.*	*Q34 When I get something new I always go ahead and use it without reading instructions **84%.***

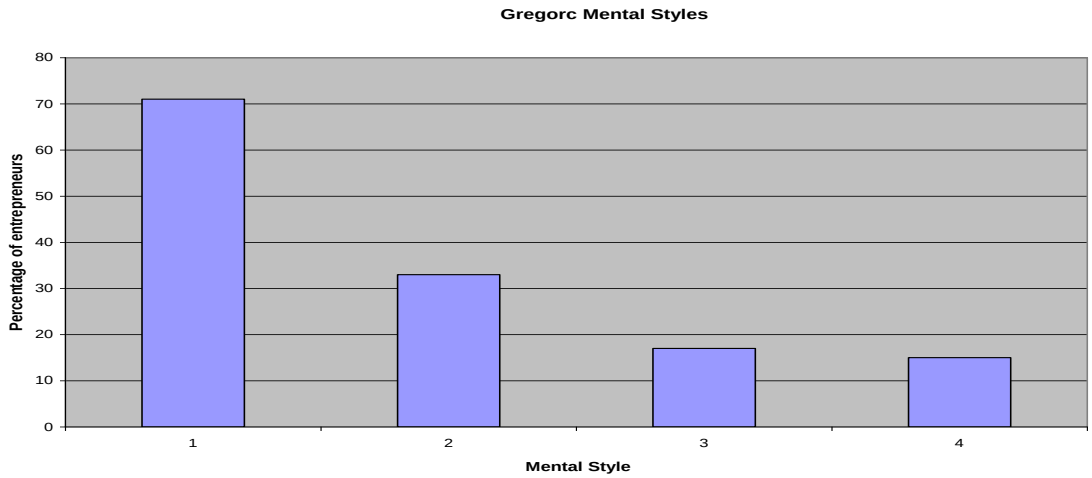
Overall, it was clear that the left hemisphere characteristics that did feature strongly were:

- **Good budgeting and control of finances.**
- **Giving careful thought to decisions and considering options before acting.**

The relevance of these abilities in a successful business enterprise is obvious.

4.3 Gregorc's Mental Style Delineator

The chart below shows the prevalence of dominant mental styles of 48 of the in the 'lead' entrepreneurs.



Column 1 Concrete Random 71%	Column 2 Concrete Sequential 33%	Column 3 Abstract Sequential 17%	Column 4 Abstract Random 15%

The findings here suggest that ***concrete*** mental styles rather than abstract styles are more prevalent in the entrepreneur respondents.. However, the other styles occurred to different degrees in *all* the entrepreneurs. The large percentage of entrepreneurs with a concrete style (71% and 33%) is very significant when viewed in the context of formal education. For instance, a theoretical approach to subjects, even Business Studies, would appear unlikely to engage them in learning – the preference is for dealing with the real and present world. As a learning preference it provokes a question about how much potential entrepreneurs in school are expected to learn *only* in abstract ways and it is valid to question what allowance is made for their 'concrete' approach to thinking and learning. The high percentage with a concrete random style (71%) raises the same question about Random thinkers and learners in formal education.

4.4 Enterprise Success Factors

70% or more considered the following 6 factors as VERY SIGNIFICANT in their success. These are associated with **right hemisphere** abilities.
1. A preference to carry out more than one task or project at a time.
3. The ability to grasp the general idea of what was required and work from this.
5. The ability to grasp the 'big picture' and overall idea of a project.
11. The ability to have an 'instinct' about the way forward and in problem-solving.
13. The ability to step out and 'take a risk'.
17. Having a person or persons around them who were good at looking after details

The overwhelming majority of the entrepreneurs considered factors associated with right hemisphere abilities much more significant than those associated with the left hemisphere. 'Whole-to-part' and intuitive/impulsive thinking was considered very significant as factors in their success. Over 90% identified *'big picture' thinking* as very significant (Factor 5). Almost 90% identified the *ability to have an 'instinct about the way forward* and *problem-solving* as very significant. *Having people who looked after details* was considered very significant by 70% (Factor 17). Also, non-conformity (*to question and challenge accepted or traditional approaches* – Factor 10) and the tendency to *'bend the rules' to achieve your goals* – (Factor 16) were also identified as very significant by over 60%.

The chart below shows responses to what factors participants considered <u>NOT SIGNIFICANT</u> in their enterprise success.

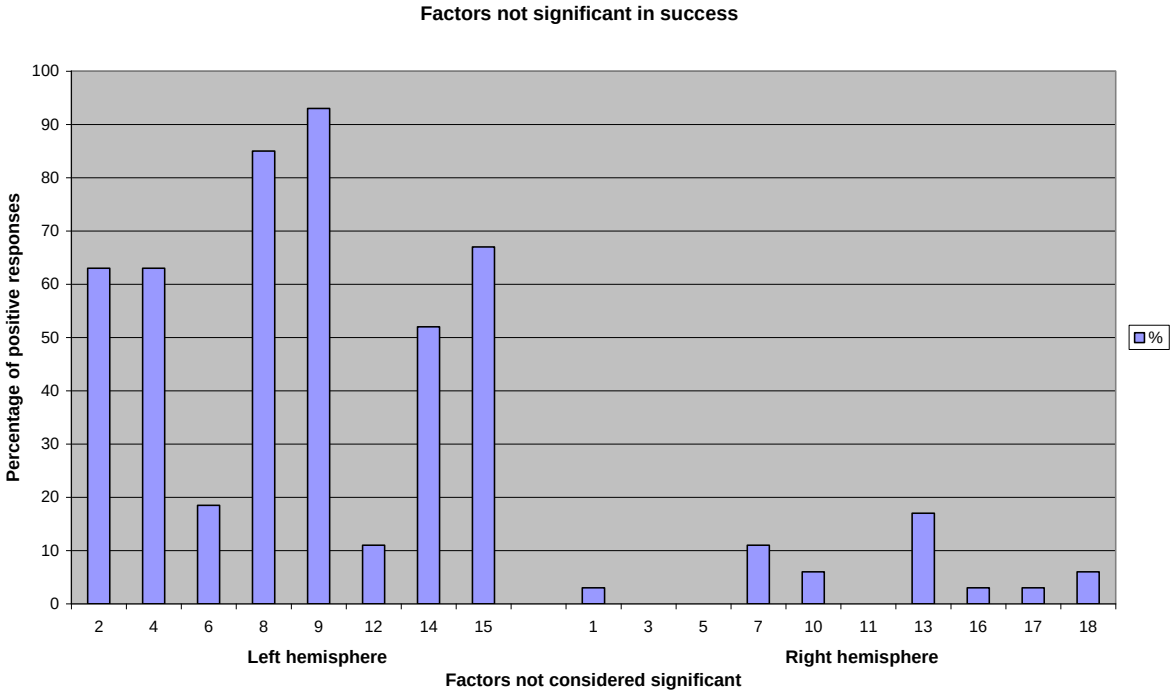


Chart 3C Factors not significant in success

Factors not Significant in Enterprise Success	
Left	***Right***
2. A preference to concentrate on accomplishing one task or project at a time.	*1. A preference to carry out more than one task or project at a time.*
4. A need for clear instructions before proceeding with a task or project.	*7. The preference to have options and alternatives about how to approach tasks.*
6. The ability to focus and get involved in the details of a project.	*10. The tendency to question and challenge accepted or traditional approaches.*
8. A preference to be given one 'correct' way to approach a task or project.	*13. The ability to step out and 'take a risk'.*
9. A preference to follow accepted solutions or accepted methods without question.	*16. The tendency to 'bend' rules to achieve your goals.*
12. A preference for reaching decisions after considering all possible options and outcomes.	*17. Having a person or persons around them who were good at looking after details*
14. A preference to be as sure as possible about the predicted outcome before acting.	*18. Being free to concentrate on the overall picture and vision and not on details.*
15. A preference to have clear rules and procedures that need to be followed.	

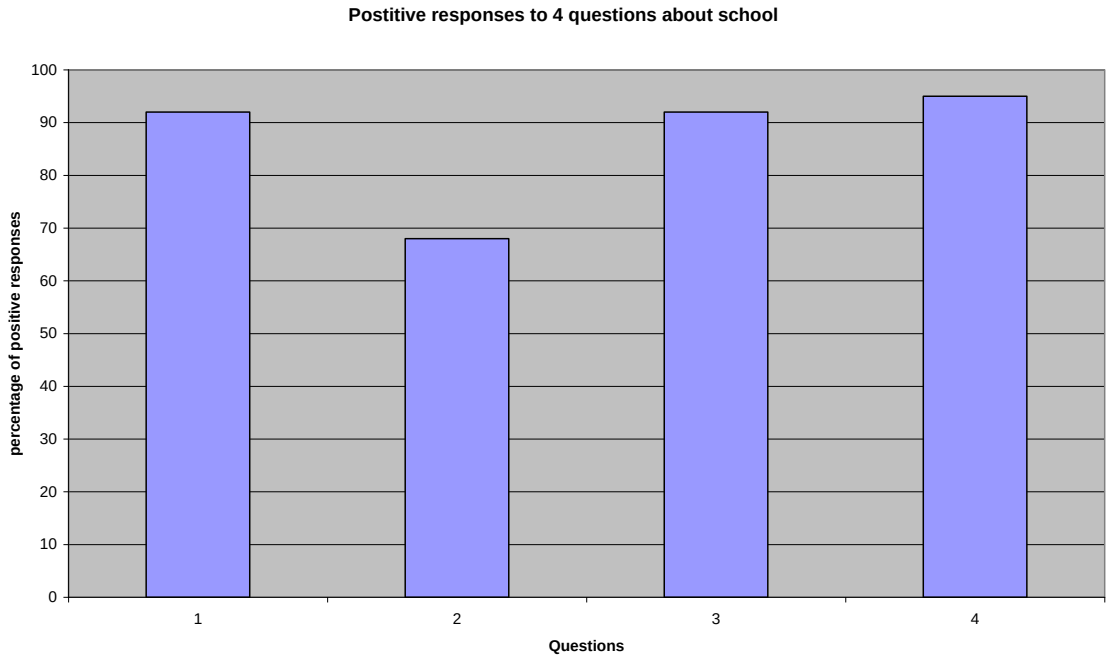
Remember these are what the entrepreneur considers to be ***not*** significant, yet the left questions describe what is the preferred approach in much education. However, overall in relation to hemispherical preferences, the results demonstrate the importance of avoiding stereotypical and oversimplified views of right and left hemisphere dominance. There is evidence that even where right hemisphere *dominance* exists, the development of left

hemisphere abilities can take place in response to the specific area of enterprise engaged in **(**Over 60% identified the *ability to get involved in the details of a project* - Factor 6), for example, financial control and budgets, careful consideration in decision-making. In an enterprise such as catering, attention to detail and lists are important. Some successful 'lead' entrepreneurs develop partnerships or team relationships with people who are more comfortable with left hemisphere abilities. In some cases this was a financial director or partner who was at home with details.

The enterprise success factors clearly identified having someone around the entrepreneur who could handle details and leave him or her free to focus on the 'overall' picture.

4.5 Characteristics of 'lead' entrepreneurs at school

The questionnaire gathered information on 28 possible preferences of the 'lead' entrepreneurs during their primary and post-primary education. There was a wide variation in these results, but three were strikingly prominent i.e. above 90%, as is shown below:



Characteristics 'lead' entrepreneurs at school
1. The need to know why something had to be done and what the point of doing it was.
2. Difficulty in following rules.
3. Questioning rules and often thinking of a 'better' way to do something.
4. Preferring to have options and choice and not have to do something in one way.

These characteristics are also associated with right hemisphere characteristics and a concrete random mental style. In lateralisation theory the overwhelming holistic responses would again indicate **right hemisphere dominance** in the majority of entrepreneurs.

Even if the theory of lateralisation is not accepted, the previous results still demonstrate a prevalence of whole to part thinking which has practical implications for teaching and learning. These results offer significant insights into learning preference of entrepreneurs.

4.6 Interviews on Education and Enterprise Background

There was a variation in educational attainment. Some left school with no qualifications and others had third level education. A significant number did not achieve at school, but **on finding a purpose for learning** related to work or a goal to achieve not only gained qualifications but enjoyed doing so. Of this group the following is a typical example of learning being stimulated by concrete work experience:

'I failed the 11+ and did the Review. I did 3 A-levels and went to the Poly [Ulster Polytechnic]. It was unheard of in those days to go from Grammar School to Poly. I did a BA Honours in Hospitality Management. I struggled academically in school but I got a 2.1 in the degree. The reason why is because, when I started the degree I struggled, but what did it for me was that I had a sandwich course. I had a year and a half in industry. When I went back to Poly after being in industry everything made perfect sense. That brought me from a 2.2 to a 2.1. I remember my lecturer saying to me at the time, "We can't believe the change in you." They felt my whole personality had changed when I came back'.

4.7 Contribution of School to Enterprise Success

Apart from 'essential skills' most of the sample said that school had not contributed much if anything to their entrepreneurial success. This did not mean they did not enjoy school, but where school was associated with success it was the peripheral aspects of education, including:

- teamwork and competitive sports
- socialising and building confidence in relationships
- communication skills
- leadership opportunities
- learning discipline
- learning to think

4.8 Family

There was a wide variation in any family background in business. Many entrepreneurs had no family background in business at all. Where there was a family background this had a greater influence than school in choosing a career in enterprise.

4.9 Motivation to begin an enterprise

These factors corresponded to some of the recognised 'traits' of entrepreneurs. Among the motives were:

- *Wanting to work for oneself*
- *To achieve and be successful*
- *To be financially well off*
- *To reap the rewards of one's work*
- *Being made redundant and not being able to get a job*
- *To bring about change*
- *To challenge oneself*

The desire to improve other people's lives and bring about change was a factor for Social Entrepreneurs:

'I read a paper called 'Cry of the Poor'' and realised the very high levels of social deprivation in areas of Belfast. I became a voluntary director on the Board of a charitable social enterprise and later became Chief Executive. I provided work for third generation unemployed people'.

5.0 Conclusions of the Findings

The findings clearly demonstrated a prevalence of characteristics associated with **right hemisphere dominance**. When these characteristics are considered in an educational context they offer significant insights into how entrepreneurs prefer to learn. This has implications for how they should be taught i.e. curriculum design, pedagogy and assessment. This study indicates that the context of the educational environment can directly influence entrepreneurship, and if this educational environment favours left brain learners then it is less likely to contribute positively to potential entrepreneurship.

It must be made very clear that this research is not claiming that there is less value in left brain preferences; rather, that the bias at present *is already* towards those students and a left brained approach to teaching and learning. This left brain bias is deeply entrenched.

5.1 Concrete versus Abstract learning

If a curriculum favours abstract and theoretical learning, pupils with entrepreneurial flair are forced to learn *against* their learning preference. Studying a prescribed course when the student sees no purpose to the information to be learnt definitely favours left hemisphere dominance. For a potential entrepreneur, the ability to use left hemisphere skills is related to seeing an overall purpose for doing so.

5.2 Assessment Instruments

Examinations based on theoretical and abstract learning may in reality be tests of left hemisphere abilities. Achievement and recognition which are based on examination success will appeal to left dominant students. The entrepreneurial motivation for achievement will probably not be acknowledged or rewarded if written examinations are the only form of assessment.

5.3 Conforming versus Non-conforming

Right hemisphere dominant entrepreneurs tend to question accepted approaches and explanations. In this sense they are non-conforming. This is the same right hemisphere ability that leads them to do something that may involve a risk or be innovative. An approach to curriculum and the delivery of a curriculum that prescribes 'one way' of thinking and bases assessment on being confined to this can work against the way the entrepreneurial mind thinks. The findings show overwhelming evidence that entrepreneurs questioned and challenged accepted views at school and preferred to consider options than be given one way to do something. It is possible that this person can often be seen as a 'trouble maker' in the class and either removed by those in authority or left to drift out of the system.

5.4 Curriculum Planning by Left Hemisphere Dominant Individuals

Those with stronger left dominance will be 'at home' at planning the details of curriculum and assessment. In using their abilities to structure and

think logically and sequentially they can produce a curriculum that favours the left dominant student and alienates those with right dominance. If a curriculum devised to teach entrepreneurship is assessed by written examination that requires repetition of information, a left dominant student could gain an 'A' grade and *a right dominant entrepreneur could fail!*

5.5 Curriculum Pedagogy

If a curriculum which favours left hemisphere learning is delivered by a teacher who is also left hemisphere dominant it is possible that the problem can be amplified. Only conformity is likely to continue to be rewarded and this is problematic when entrepreneurs do not simply accept what they are told, but question it instead.

5.6 Further and Higher Education

Arguably a significant percentage of students who enter further education colleges could be right hemisphere dominant. They may be attracted to the less formal lifestyle (non-conforming) at 16 years of age in contrast to 'formal' sixth form education. A college environment could be more attractive to a potential entrepreneur. The implication is that College may provide an environment more attuned to the entrepreneurial learner. However, if college curriculum and pedagogy does not recognise the significance of *how* potential entrepreneurs learn, as well as *what* it is important for them to learn, the potential may not be realised as effectively as it could be.

In order to access **Higher Education,** students must meet with tight academic entry requirements, more often displaying the 'Gold Standard' 'A' Level passes. While there is obviously choice in the type of university entry qualifications levels one can follow, by and large those which are seen as having the highest currency will have suited those who are left hemisphere dominant. Once enrolled on a course it is likely that the university student will receive teaching that is left brain dominant in both its target and delivery and frequently assessed accordingly. If an HE student is interested in entrepreneurship they can avail of modules such as those delivered by NICENT. However, even the 'Programme Aims and Learning Outcomes' for modules delivered by NICENT appear to be left brain dominant.

Also, due to uncertainty concerning the scientific basis of some aspects of learning preferences theory, this study suggests that the current system within Higher Education will do little to support or encourage entrepreneurship beyond 'fringe activities'.

5.7 Valuing Left Hemisphere Abilities

The findings of this research have indicated that certain left hemisphere abilities are needed for the establishment and sustaining of business ventures. Success in enterprise can depend on the entrepreneur either developing these for themselves, or more often, recognising the support of others around them who have these abilities. If the curriculum begins to take better account of more right brained dominant learners, it is important that this is accompanied by the requirement to encourage and inspire more left dominant learners in the crucial role they could play in enterprise in complementing the lead entrepreneur.

5.8 Details versus Overview

If potential entrepreneurs are faced with left hemisphere 'hoops' to jump through in order to begin enterprises they could be frustrated. For instance programmes to encourage enterprise that are strongly left hemisphere biased, delivered by trainers who are also left hemisphere dominant will lead to a mismatch with potential entrepreneurs. The best way to help them to learn how to work through the planning and administration needed for starting a business is to present the course in ways that are sufficiently suited to their right hemisphere learning preferences.

5.9 Working with Potential and Existing Entrepreneurs

Organisations and agencies who work with these people need to be more aware of when they are requiring left hemisphere thinking and behaviour from entrepreneurs. There is a strong possibility that Government institutions and agencies tend to be staffed by people who have stronger left hemisphere abilities and are on career paths that favour these.

There is arguably a need to promote an awareness of how much understanding and assistance an entrepreneur may need, in order to work through detailed administrative procedures and left hemisphere 'hoops' which can appear to right brain dominant entrepreneurs as insurmountable barriers to overcome.

6.0 Recommendations

This current study suggests that progressing towards creating an 'enterprise culture' in Northern Ireland cannot happen without a greater 'enterprise culture' within education, and this cannot happen unless the insights of hemisphere dominance in education is given more practical recognition.

There is considerable value in assessing existing educational provision in terms of how it is actually *designed* to *sustainably educate* left and right dominant learners under the ever present influence of left brained dominance in education. Genuine debate needs to be undertaken with regard to how education genuinely tests and rewards enterprise and entrepreneurial flair to the same degree as traditional curricular areas.

Project-based initiatives are currently the mainstay of stimulating enterprise through education, and while essential with many positive benefits, they also have significant limitations such as their short-term duration and the relatively small proportion of students who actually participate in them. While effort could be made to increase the number of pupils involved and the duration of the projects, on the basis of this research they might fail to succeed in creating entrepreneurs if they simply continue to randomly engage students without any consideration of their learning preferences. If no account is taken in the design of the project for learning preferences, they will likely fall far short of producing *large numbers of students* with an enterprising approach to their own employment. This research suggests that 'enterprise projects' cannot ignore the impact of hemisphere

dominance, especially when a student's formal education does not place a high value on encouraging right hemisphere abilities. However, it will be the right brained students who are *most likely* to start new enterprises and *less likely* to simply look for secure employment after education. The random selection of participants should be replaced by an:

a. *Awareness in the student* participating in such a project into his or her learning preferences and how these contribute to enterprise. This could then be 'connected' to how the 'everyday' curriculum of school can contribute to enhancing the strengths and strengthening the weaknesses essential for entrepreneurship and enterprise. This could lead to students engaging more with the school curriculum *outside* of the enterprise project.

b. *An awareness of learning preferences in the teachers* who supervise and facilitate these projects as they seek to sustain the interest and enthusiasm of student aroused through the one off project. The teachers would be better equipped to continue to encourage and guide the students who had participated. It could be invaluable for providing relevant careers advice.

Beyond 'enterprise projects' this research suggests that the 'traditional' educational working environment may actually 'dampen' right brain thinking that is inherent in entrepreneurs and enterprising behaviour. The 'bath' that was filled by being involved in an enterprise project could be 'drained' in 'traditional' education. The findings of this research clearly indicate that any curriculum developed to encourage and stimulate enterprise in pupils needs to be sufficiently right 'hemispheric' to *inspire* as well as *inform* potential entrepreneurs. This study shows that entrepreneurs tend to be 'Concrete' learners who do not learn by studying theory for testing by examination.

Indeed those behind the Revised NI school curriculum must be commended for their foresight in designing a course of study more in tune with those displaying right hemisphere preferences. However, there is a possibility that the intentions of a revised curriculum that is actually planned to suit right brain dominated pupils, and therefore as this study illustrates, potential entrepreneurs, might not be realised due to the strong influence of those teachers and educational policy makers who are left brain dominant. It is therefore crucial that work continues to ensure that its objectives are supported and developed and that through time it does not slip back into a tightly controlled, traditional, knowledge recall format. The importance of facilitating learning preferences must be underscored by:

1. Knowing a student's learning preference in terms of right or left dominance by equipping teachers to recognise and deal with right and left brained learners. If teachers are 'uneducated' regarding hemisphere dominance the potential in the new curriculum is diminished.

2. Stimulating right-brained students who have the innate capacity to be more enterprising about employment. Instead of creating the *expectation of being employed* in a job created by someone else (public or private sector) more students would be educated for 'self-employability' and creating employment for others.

3. Not continuing with the rejection of non-conforming students who challenge rules and accepted approaches. These essential entrepreneurial characteristics in students who will think 'outside the box', and prefer to live and work 'outside the tramlines' will only be recognised, valued and nurtured by greater awareness of these as right hemisphere abilities.

6.1 Further and Higher Education

Both Further and Higher Education in Northern Ireland have to be commended for the excellent work that they are currently undertaking to ensure that entrepreneurship now has a higher profile amongst their students and staff. However post-compulsory education is much more complex than schools as they are not governed by a statutory common curriculum that can be easily monitored.

As with schools, there is a strong possibility that not recognising in the design and delivery of courses right hemisphere motivation, the entrepreneurial potential of post-compulsory students will not be realised. However, the FE sector faces significant problems with any attempt to introduce a more right brained approach if this is not accompanied by an endorsement by the course-funders and examination providers. This is a major issue that needs to be addressed before the FE sector can offer more than simply an insight and exposure to entrepreneurship as a career option.

As FE is a new step in a student's educational career, it is an opportune time to *offer all students* a learning profile entry assessment and then use this to ensure that the College's enterprise agenda relates to interaction with the more right brained students. DEL could consider setting up a team to bring 'joined up' thinking regarding how to expand the concept of South Eastern Regional College Business Innovation and Development Units (or any other similar body in other Colleges) in a way that incorporates the findings of this research into learning styles and enterprise.

With regard to Higher Education, many students will either be naturally left hemisphere dominant or have adapted to use their left hemisphere abilities in order to reach that level of education. It will be the naturally right dominant students who could be potential entrepreneurs, but this may be 'sublimated' and not apparent even to the student. If university students who have entrepreneurial potential are to be identified and engaged in enterprise, this study suggests an important ingredient in doing so successfully lies in considering their learning preferences as a component of the modules (content, delivery and assessment) they undertake.

6.2 Interpreting Negative Responses to Compulsory Education.

There is strong evidence from this study that a student with entrepreneurial potential will be non-conforming and question accepted views and approaches presented in formal education settings. If the phase of compulsory education does not take this into account it is these pupils that are more likely to become disengaged and even labelled as 'disruptive'. The more right brain dominant a student is, the greater his or her need will be to be *taught* to know when non-conformity is valuable and to be encouraged. If the curriculum, the testing instruments and the teachers predominantly recognise and reward *conformity* there will be a continual problem for the enterprising pupil.

Non-conforming behaviour can begin with non-conforming thinking and this is part of the flair of an entrepreneur that is to be valued. The paradox here is that arguably the pupil with the most potential to be a successful entrepreneur is *filtered*

out of an education system that prefers the conformist individual who may never aspire to be entrepreneurial. This study recommends that there needs to be much more attention given to not simply controlling and preventing what is seen as non-conforming thinking and behaviour, but rather harnessing this feature to the advantage of the pupil and society – this is a major consideration that requires more research and debate.

6.3 Lifelong Learning

Within Northern Ireland a considerable number of individuals leave compulsory and non-compulsory education without qualifications or fail to engage in lifelong learning through further training or education. Arguably, a significant proportion of these individuals 'failed' in the education system because they were right dominant learners in a left dominant education environment. The research findings suggest that re-engaging them in learning and training might require right brained approaches.

6.4 Promoting Entrepreneurship Career Options

This research has shown that entrepreneurs are more likely to engage their left hemisphere abilities if they see a purpose for doing so. Indeed, for most of them this is a necessity. The inspiration of a possible career in commercial or social enterprise could be the stimulus needed to apply themselves 'academically'. A significant step towards this would be to use information such as that compiled in this study to introduce pupils at primary and post-primary levels to entrepreneurs in all the categories interviewed. These can serve as local 'role models' and 'concrete' examples are powerful influences on right dominant pupils. It also prevents children thinking that entrepreneurs have to be national celebrities. Many of the entrepreneurs in this study created small and medium sized enterprises.

The question also arises of how equipped ' careers teachers' and ' careers advisers' are to present the option of a career in enterprise? Due to the amount of descriptive information and form filling involved in traditional careers advising, could it be that careers education favours left hemisphere dominated teachers/advisers. How are they being equipped for this and who has responsibility for this advice?

6.5 Government Enterprise Agencies

This research suggests that organisations that are mainly administrative in 'culture' probably favour left hemisphere dominance and thus develop what may be thought of as a 'left brained culture' or 'organisational' mindset. This highlights an interesting possibility that, although they may have to deal with, and even seek to encourage, entrepreneurship, they may not be entrepreneurial themselves or enterprising *as an organisation*.

This raises an important question regarding entrepreneurial thinking *within* government bodies. Is it possible that it takes a right brained person to think like an entrepreneur, just as it takes a left-brained person to think as an administrator? When government bodies seek to engage with entrepreneurs there is a strong possibility of a mismatch of brain dominance which can lead to the entrepreneur having to deal with the problem of working with a predominantly left-brained institution. It is very likely that the response an entrepreneur encounters when engaging with a

government body will be probably different depending on the brain dominance of the person he or she encounters. These may seem to be bold generalisations, but the research suggests that there is room for reflection on this and perhaps more investigation.

Implementing changes like these requires left *and* right dominant thinking working together as a team. More effort needs to be made to include right and left dominant thinkers in government teams that develop, oversee and implement any initiatives or programmes that are supposed to encourage enterprise and entrepreneurship.

This raises the further interesting question of the role of entrepreneurs within government bodies and organisations i.e. Intrapreneurs. According to the research these people will be right brained thinkers with characteristics highlighted in the findings. There is a case for further study into the role of Intrapreneurship as a stimulus to enterprise both inside and outside government departments. This could make a contribution in the pursuit of *Innovation in Government.*

6.6 Harnessing Entrepreneurial Guidance

During the interviews for this research there was universal good will and considerable interest in the future launch of the study report. As ' concrete' thinkers, the entrepreneurs were eager to know *'What is going to be done with this research?'* It was apparent that the very people who have made a success of enterprise and entrepreneurship have an interest in the education as well as in the economy of Northern Ireland. They all have a background in education personally and children who are presently in education or have been in the past. However, other than being used as role models, there seems to be few opportunities for them to have a sustainable and significant influence on education for enterprise. However, they know so much about successful entrepreneurship and enterprise and represent a 'pool' of expertise and experience that should be better harnessed in education to generate a more 'enterprising culture' in Northern Ireland. It makes sense to see them as *stakeholders* in education in Northern Ireland and not only in the economy.

An Enterprise think-tank is needed that would allow a creative interface between education and entrepreneurship. DEL or DE could lead this, but to succeed it is crucial that it has a balanced left *and* right brained representation on the part of the government departments. This collaboration could be one of the most significant drivers towards producing a new generation inspired and equipped to achieve a genuine enterprise culture in Northern Ireland. Using learning preferences as a catalyst, this research highlights two complementary needs if a true enterprise culture is to be realised at this critical time in Northern Ireland.

1. Fostering entrepreneurship must be central *within* curriculum and pedagogy in schools and colleges rather than relying on one-off projects/competitions/events or entrepreneur presentations. While it is important for students to be exposed to entrepreneurs, arguably it will do little to create entrepreneurs if schools and colleges continue to favour left dominant students who are, on the basis of this study, less likely to become entrepreneurs.

2. Government bodies responsible for promoting enterprise and entrepreneurship in Northern Ireland are liable to be more successful at achieving their objectives if they have a greater understanding of right and left brain characteristics. More consideration could be given to the encouragement of right brained thinking and right brained thinkers *within* these organisations.

It is anticipated that reluctance and resistance to explore or implement the necessary changes to develop an enterprise culture in schools, colleges and universities may come from people who are most comfortable with an environment and curriculum which favours left hemisphere abilities. Arguably it is also these individuals who have, by and large, traditionally determined policy and practice in both the educational and research arena.

This study suggests that awareness of the role of lateralisation and hemisphere dominance could be a valuable factor in realising the goal of an enterprise culture. Enterprise projects, Government departments and education at all levels could be impacted significantly by a greater appreciation of the characteristics of entrepreneurs that are due to right hemisphere dominance. Suggestions for further research have been made throughout the report. However on the evidence of this study there would seem to be a strong case for applying some of the *existing* knowledge about the role of the brain in learning sooner rather later if we are to rise to the economic challenges of our time.

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Entrepreneurial Learning Preferences: *A Checklist for Curriculum Planners and Teachers*

Left and Right Brained Preferences

A strong **Right-Brained** dominance is the norm for entrepreneurs, in particular:

1. Preferring to be given a 'general idea' rather than specific instructions.
2. Treating rules as guidelines and bending them to suit.
3. Questioning ways of doing things that are usually accepted by other people
4. Preferring to be actively involved in more than one task at a time.
5. To be given options, flexibility and negotiation rather than be told to do a task in one way.
6. Process Driven - the need to know *why* one is doing something more than simply *how* to do it.

Left Brain abilities are prominent in relation to:

1. Good budgeting and control of finances.
2. Giving careful thought to decisions and considering options before acting.

Gregorc's Mind Styles

A Concrete Random Approach is Dominant:

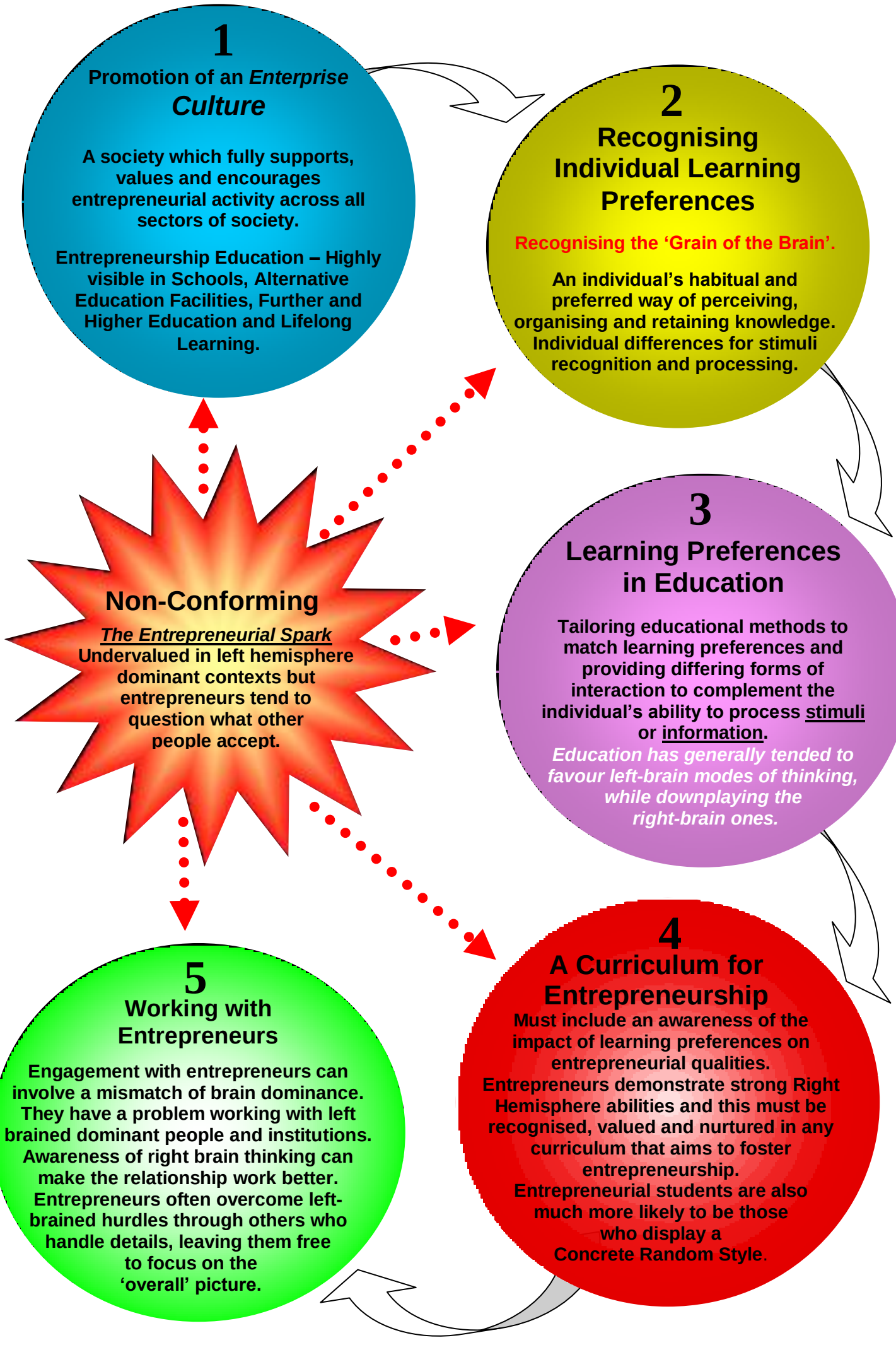
Preferences *- Experimenting to find answers, take risks, use their intuition, solving problems independently.*

Learning Context *- Use trial-and-error approaches, able to compete with others, given the opportunity to work through the problems.*

Dislikes *- Restrictions and limitations, Formal reports, Routines, Re-doing anything once it's done, Keeping detailed records, Showing how they got an answer, Choosing only one answer, having no options.*

A Curriculum for Entrepreneurship

Fail to take account of these guidelines - expect to fail in fostering entrepreneurship.


1
Promotion of an *Enterprise Culture*
A society which fully supports, values and encourages entrepreneurial activity across all sectors of society.
Entrepreneurship Education – Highly visible in Schools, Alternative Education Facilities, Further and Higher Education and Lifelong Learning.
2
Recognising Individual Learning Preferences
Recognising the 'Grain of the Brain'.
An individual's habitual and preferred way of perceiving, organising and retaining knowledge. Individual differences for stimuli recognition and processing.
3
Learning Preferences in Education
Tailoring educational methods to match learning preferences and providing differing forms of interaction to complement the individual's ability to process stimuli or information.
Education has generally tended to favour left-brain modes of thinking, while downplaying the right-brain ones.
4
A Curriculum for Entrepreneurship
Must include an awareness of the impact of learning preferences on entrepreneurial qualities.
Entrepreneurs demonstrate strong Right Hemisphere abilities and this must be recognised, valued and nurtured in any curriculum that aims to foster entrepreneurship.
Entrepreneurial students are also much more likely to be those who display a Concrete Random Style.
5
Working with Entrepreneurs
Engagement with entrepreneurs can involve a mismatch of brain dominance. They have a problem working with left brained dominant people and institutions. Awareness of right brain thinking can make the relationship work better. Entrepreneurs often overcome left-brained hurdles through others who handle details, leaving them free to focus on the 'overall' picture.
Non-Conforming
The Entrepreneurial Spark
Undervalued in left hemisphere dominant contexts but entrepreneurs tend to question what other people accept.

Life-long Learning:
A 5-Star Approach to Fostering
Brain-Matched Entrepreneurship Capability