

Implications of Mind, Brain, and Education Research for Study Abroad

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The field of Mind, Brain, and Education focuses on neurological, psychological and educational research into how people learn and what kinds of interventions might enhance learning. While the learning in Study Abroad situations is often considered to be mainly formal and classroom-based, the author argues that most of the scope for learning offered by SA is informal and occurs outside the classroom. This paper examines how the strongest principles from Mind, Brain, and Education can be applied to informal learning in Study Abroad situations and suggests ways in which this learning can be supported by professionals who work with Study Abroad students.

Key Words : Study Abroad, Brain, Informal Learning, Experiential Learning

Introduction

The desire to study abroad is driven, fundamentally, by the human brain's drive to seek out difference. Originally a survival mechanism, the predisposition of the brain to focus on novelty developed as a way to recognise potential threats to the human organism, in environments where what was different might be lethal (Calvin, 1996). Like all essential survival mechanisms, the search for novelty is self-rewarding: finding things that do not fit into previously understood patterns leads to the release of dopamine, the brain's "reward" chemical, which causes sensations of pleasure and excitement (Wise, 2004). This mechanism is, of course, the basis of all learning.

Since this human "thirst" for novelty" (Tokuhamma-Espinosa, 2011, p. 212) is the fundamental motivation for studying abroad, one might expect that Study Abroad programmes would be designed to maximise opportunities for participants to encounter difference and to learn from it. Such is, however, often not the case with university-level Study Abroad programmes. Curricular constraints, coupled with the understandable desire of many students not to fall behind on their path to graduation, often result in students' spending much of their time in the foreign environment studying things they could have studied on their home campus. To earn credit at home for their studies overseas, they find

themselves obliged to spend large parts of their day focusing on studies that replicate the home-campus experience as closely as possible. Even on short-term Study Abroad programmes, students will often sit in classrooms which resemble those at home, studying a language they have been learning for years before they left their home environment.

Where, then, is the novelty, the expected pay-off for having travelled to a foreign location, usually at great personal expense of time, money and effort? Well, of course, it is all around. There is novelty in the interaction patterns in the classroom, on the menu in the school cafeteria, in the transport system that brings students to school, in the stores where they buy their food, the entertainment opportunities offered, the accommodation options and the casual encounters in, outside and around the classroom experience. These are the differences that students travel for. These are the learning opportunities that enrich students' life experiences, re-arrange their expectations and expand their minds.

Yet, in many Study Abroad programmes, the focus is on the formal, classroom-based learning, the part of the experience that is least novel. Although this formal learning occurs in an environment that is rich in novelty, there has traditionally been little focus on the informal learning opportunities afforded by the environment. Informal, out-of-class learning has often been left to its own devices, as something

students discover for themselves. This is, perhaps, understandable, as many Study Abroad programmes are designed and implemented by people whose background and professional expertise is in the formal education sector – teachers and advisors who are pre-disposed to see learning as something that happens in classrooms.

This paper will explore what can be done to support the informal learning that should be the key experience when studying abroad. It will draw on findings from the emerging field of Mind, Brain, and Education Science (Tokuhama-Espinosa, 2011) to suggest ways in which informal learning during Study Abroad can be encouraged, enhanced and supported.

Mind, Brain, and Education Science

The field of Mind, Brain, and Education Science emerged, as recently as 2007 (OECD, 2007), by the conscious joining-together of key findings from three existing fields: Psychology, Education and Neuroscience (Tokuhama-Espinosa, 2011, 2014). It is based on the expectation that, by bringing together the three fields, enhanced understanding of the mind, the brain and of how human beings learn will result. As each field informs the other, psychologists gain greater insight into how the mind works, neurologists will learn more about how the brain functions and educationalists will have a clearer understanding of how mind and brain learn. From the point of view of education, Kurt Fischer (2009), one of the leaders of the new field, has explained that: “an important goal of the emerging field of Mind, Brain and Education (MBE) is the creation of a strong research base for educational practice – a groundwork of usable knowledge about what makes for effective learning and teaching.” While much of the focus of the new field has been on the teaching part of this goal – what teachers can do in a classroom setting to help their students learn – there is much to be gained from a psychological and neuroscientific understanding of how people learn that can be applied to informal learning in a Study Abroad situation.

One of the advantages of a newly-formed field is that very little is taken for granted. Even long-accepted learnings from other, parent, fields are re-examined in terms of the available substantiating evidence. In the case of Mind, Brain, and Education Science, this role was performed by the Organisation for Economic Cooperation and Development, which organised a series of international conferences in New York (2000), Granada (2001), and Tokyo (2001) to “synthesize opinion and concerns and to design agendas for

research in the emerging discipline at the intersection of neuroscience, psychology, and education” (Tokuhama-Espinosa, 2001, p. 67). The OECD effort culminated in a book: *Understanding the Brain: Towards a New Learning Science* (OECD, 2002).

The book (OECD, 2002) assigns claims made by the new field to one of four categories, based on the amount of substantiating evidence available for each claim. These categories constitute what is known as the “OECD continuum” (Tokuhama-Espinosa, 2011, p. 75) and are as follows:

- A. What is well established
- B. What is probably so
- C. What is intelligent speculation
- D. What is a popular misconception or a neuromyth

Tokuhama-Espinosa (2008, cited in Tokuhama-Espinosa, 2011) compares these categories with those used by the (U.S.) National Center for Education Evaluation and Regional Assistance’s *What Works Clearinghouse* (<http://ies.ed.gov/ncee/wwc/>) and concludes that the following evidential criteria apply to the OECD criteria:

- A. Strong evidence of a positive effect with no overriding contrary evidence.
- B. Evidence of a positive effect with no overriding contrary evidence.
- C. Evidence of inconsistent effects.
- D. No affirmative evidence of effects.

Tokuhama-Espinosa (2011, pp. 78-83) then proceeds to categorise each of the claims about Mind, Brain, and Education Science in terms of the OECD continuum, based on evidence available as of 2010 (Tokuhama-Espinosa, 2011, p. 85). Not surprisingly, there are many more claims in categories C and D (25 and 29, respectively) than in A (5) and B (19).

The remainder of this paper will examine the relevance of claims in categories A and B, which Tokuhama-Espinosa elsewhere (2014, p. 24) calls “principles that great teachers follow,” to discover which are applicable to the kind of informal learning that should be at the heart of the Study Abroad experience, and then how they can inform the practice of those who work with Study Abroad students.

What is well established (A)	
A1.	Human brains are as unique as faces.
A2.	All brains are not equal in their ability to solve problems.
A3.	The brain is a complex, dynamic and integrated system that is constantly being changed by experience.
A4.	Human brains have a high degree of plasticity and develop throughout the lifespan.
A5.	Connecting new information to prior learning facilitates learning.
What is probably so (B)	
B1.	Human brains seek and quickly detect novelty.
B2.	Human brains seek patterns upon which they predict outcomes.
B5.	The overt teaching of key concepts facilitates new learning.
B7.	Nutrition impacts learning.
B8.	Sleep is important for declarative memory consolidation.
B9.	Stress impacts learning. Moderate stress increases attention. Excessive stress blocks learning.
B11.	Feedback is important to human learning.
B15.	Support from others is critical to learning.
B16.	When knowledge is actively constructed by a learner, the learner will be motivated and engaged in learning.
B18.	Water is brain food.
B19.	The search for meaning is innate in human nature.

A. What is Well Established

These are very basic principles indeed, though some of them, such as neuroplasticity and brains that continue to adapt and develop throughout a lifetime were contested until quite recently (Dodge, 2007). None of them is a surprise to people involved in education, but each has its implications for Study Abroad.

A1. Human brains are as unique as faces.

Teachers know this from long experience. No two students react the same way to the same idea, situation or task. However, the reason why each brain is unique is the basic motivation for considering Study Abroad, and travel in general, to be an educational experience. No two brains are the same because no two human beings have the same experiences (Devlin & Poldrack, 2007). Thus, the brain is formed by experience. As noted above, it is the desire to have new and different experiences which motivates students to study abroad and drives Study Abroad as an educational endeavour. By having such experiences, students are literally reshaping their brains.

A2. All brains are not equal in their ability to solve problems.

It will become clear later that problem-solving is crucial to the way the brain deals with novelty. Problem solving skills are developed by experience and, as stated in A1, experience is unique. Tokuhamma-Espinosa (2011, p. 78) explains that both ability and context influence learning, citing (2014, p. 26) the hypothetical case of a child born with great musical talent who never has access to a musical instrument. It follows, then, that new experiences in

new contexts enhance the possibilities for learning, enrich and, as stated in A1, re-shape the mind.

A3. The brain is a complex, dynamic and integrated system that is constantly being changed by experience.

The idea that experience actually changes the brain is borne out by those who return from a Study Abroad experience as “different people” with changes in their worldview, thinking and, on a microscopic level, the architecture of their brains. What has changed, in essence, is the formation of new connections between different areas of the brain and of new synapses (Tokuhamma-Espinosa, 2014, pp. 26-27). This happens on a daily basis to everyone, wherever they are, whatever they are doing, each time they encounter novelty (Freitas et al., 2011). The richer the environment is in novelty, the more often it happens. Study Abroad offers just the kind of novelty-rich environment which stimulates rapid neurological change.

A4. Human brains have a high degree of plasticity and develop throughout the lifespan.

Neural plasticity is the feature of human brains which allows them to learn. Although it was long thought (Dodge, 2007) that the physical features of the brain do not change with time and that learning and adaptation affect only the software inside the brain (the mind), it is now clear beyond doubt (Dodge, 2007) that not only do new experiences give rise to new connections between different parts of the brain, they can also cause new synapses to grow. Changes in the brain, whether caused by a stimulus in the natural environment, a new idea learnt in a classroom or an encounter with novelty whilst studying abroad,

are what constitute learning.

It is never too late to study abroad or, more generally, expose oneself to new experiences. While the limits on neuroplasticity have been found to increase with age (Freitas, et al., 2011), the brain never stops learning from new experiences while the organism is alive.

A5. Connecting new information to prior learning facilitates learning.

This principle begins to explain the “how” of learning. The connections of the brain, formed by prior learning, encounter something new and the brain attempts to connect this new element to its existing network. The new element may be as simple as seeing cars driving on an unaccustomed side of the road, or as complex as a friend’s unexpected reaction to a situation. The brain first recognises it as new or unexpected and then attempts to integrate it into existing neural connections.

Integration can take many forms, depending on how deeply the existing knowledge is entrenched. Bennett (1986) has categorised reactions to difference under six headings:

1. Denial of Difference
2. Defence against Difference
3. Minimisation of Difference
4. Acceptance of Difference
5. Adaptation to Difference
6. Integration of Difference

Although Bennett sees these as developmental psychological stages through which a sojourner (eg. Study Abroad student) passes on the way to interculturally enlightened maturity, it is also possible to see them as waystages on a neurological continuum from denial to integration. Accustomed pathways and connections in the brain may at first reject novelty as illusional (“It can’t have been.”) or exceptional (“These people are just crazy.”); further exposure to the novelty makes it less novel and more a part of the accustomed pathways and connections (“That’s just a different way of doing the same thing.” “I could do it that way.”).

As shown in A4, the changes made in the brain by encounters with new things constitute learning, so what is being described here is the learning process. Teachers often talk of “scaffolding” new learning, borrowing a term from Vygotsky (1934) to describe the careful stages by which they build new knowledge on top of a student’s existing understanding. One feature of the Study Abroad environment is that

there is often no teacher present to help grade and structure new experiences. The student must do what s/he can to find connections between the existing and the novel.

B. What is Probably True

This category contains a further group of powerful, interconnected principles.

B1. Human brains seek and quickly detect novelty.

The role of novelty-seeking in motivating participation in Study Abroad programmes has already been touched on. What is assumed to have started as a survival mechanism for the early detection of potentially lethal novelty is reinforced by the brain’s reward system, and the rewards have become a strong motivation for learning (Balderston, Schultz, & Helmstetter, 2011). Just like drug addicts, learners hooked on dopamine rewards seeks out higher and higher doses of novelty, leading the bravest of them to commit to living in a totally novel environment for a semester or even a year.

The detection of novelty links what has already been said about collecting new information to prior learning, where recognition that the knowledge is new is a first step towards integrating it, with the role of pattern-seeking, described in the next section.

B2. Human brains seek patterns upon which they predict outcomes.

In order to recognise novelty, the mind needs to have a predictive ability. It is the contrast between what is predicted and what actually occurs that identifies an experience as novel. Kelly (2016) has characterised the brain as a “hypothesis-testing machine” which is constantly both generating and testing hypotheses about the world around it. The basis of these hypotheses is the ability to recognise and extrapolate from patterns.

On a neurological level, patterns outside the organism are represented in the brain by patterns of neurons which are activated repeatedly in response to the same stimulus. The repeated simultaneous activation of a pattern of neurons causes those neurons to form a connection with each other (Hebb, 1949). Lewis and Durrant (2011) outline a theory of how the brain is able to generalise from repeated similar, but not identical, experiences, to create a template of the key elements of that experience which can be used to identify other similar experiences (or if they are novel, decide that they are not similar). Thus, though

a student may repeatedly see people shake hands on first meeting each other, each occurrence will be viewed from a different angle or contain elements that are specific to one situation. According to Lewis and Durrant, the brain is able to strip away the non-standard elements by identifying parts of handshake-as-greeting that occur in all or most experiences of it. This, then, forms the pattern which allows a person to both recognise and respond to a handshake and to notice that a bow is a novel (hitherto non-standard) form of initial greeting.

Thus, the ability to recognise patterns not only allows the brain to identify novelty, it also provides a mechanism for analysing the novel experience and detecting patterns within that experience and thus incorporating them into future predictions. A Study Abroad student who is accustomed to handshakes but sees people bowing as an initial greeting will, in time, come to see the pattern in the novel activity which will allow him/her to predict under what circumstances a bow rather than a handshake is likely to occur.

B5. The overt teaching of key concepts facilitates new learning.

As the mind adapts to the disruptions to its understanding of the world caused by a novelty, there is a role for conscious learning of key concepts. Here, the Study Abroad student may draw on the work of cross-cultural psychologists (eg. Ward, Bochner, & Furnham, 2001) and scholars in the field of Intercultural Communication (eg. Sorti, 2001) to access ideas that can help them to make sense of their new experiences. A basic understanding of such concepts as culture shock, stereotyping and suspension of judgment can be helpful to Study Abroad students in many kinds of situations. It may also be that an understanding of some of the Mind, Brain, and Education concepts in this paper will be similarly useful.

Scholars have also identified a number of dimensions along which societies may vary, such as Hall's (1976) high- and low-context, Hofstede's Individualism/Collectivism, Power Distance, Uncertainty Avoidance and Masculinity (Hofstede, 1980) and Kluckhohn and Strodtbeck's (1961) six cultural dimensions. An understanding of these concepts may also be helpful, although there have been many warnings about the dangers of applying society-level generalisations to individual interactions and specific situations (eg. Ryan, 1999).

There is no shortage of guides to "the culture" of various countries and regions (eg. the "Culture Shock!" series of books, such as Wanning, 1991 and

Shelley, 1992) but very often these guides can lead to dogmatic and stereotypical thinking that can cause students to prejudge issues and form ideas that actually hinder their ability to adapt to and learn from specific experiences. It is likely that a general appreciation of how societies and the practices of members of those societies can differ from each other will be a firmer basis for learning on Study Abroad programmes.

Principle B5 recommends overt teaching of these key concepts, but in a Study Abroad setting there is often no teacher present. To compensate for this, pre-departure orientation sessions often include attempts to teach such concepts or provide lists of suggested readings which allow students to access these concepts whilst overseas.

B7. Nutrition impacts learning.

Maslow's (1943) hierarchy of needs makes it clear that a hungry student cannot pay attention to learning, but this principle goes much further. Since fully 20% of the body's energy is used by the brain (Magistretti, & Allaman, 2013) and that energy comes from food, the importance of good nutrition for a learner is clear. It is particularly important for Study Abroad students to understand this as they may be away from home for the first time and may also be in an environment where familiar, healthy foods are difficult to recognise or obtain.

In terms of what constitutes healthy food for the brain, Restak (2009) simply says that what is good for the heart is good for the brain. Ratey (2008, p. 239) goes further and suggests whole grains, proteins and dietary foods, garlic, onions, broccoli, blueberries, pomegranates, spinach and beets, washed down with green tea and red wine. Garlic, to take just one example, contains low levels of toxins which stimulate the growth and repair of neurons (Ratey, 2008, p. 239).

In other words, there is no shortage of advice on brain-healthy food, once students are alerted to its importance.

B8. Sleep is important for declarative memory consolidation.

Educators have long advocated the importance of a good night's sleep to their student. Their position is now strongly buttressed by neuroscientists. They have known since the 1950s that the brain can be more active when a person is asleep than awake (Lewis, 2014), but now it is becoming clear that much of that activity is related to the consolidation of memory (Stickgold, 2005). The process of making

generalisations from experience, hypothesised by Lewis and Durrant (2011), has been described above. Crucially, it is when the body is asleep that the brain makes such generalisations. Thus, sleep is essential to the building of hypotheses from yesterday's experience which can be tested tomorrow and re-formulated the next night, the learning cycle for experiential learning.

However, memory-consolidation/hypothesis-generation does not occur in all stages of sleep. It is dependent on a group of neurotransmitters released only during REM (Rapid Eye Movement) sleep (Tokuhama-Espinosa, 2014, p. 36) which occurs at only one part of the sleep cycle. Lewis (2014, p. 9) reports that REM-sleep comes round roughly once in every 90 minutes of sleep and is more prevalent the more 90-minute sleep cycles there are in a sleeping session (in other words, the longer the body sleeps, the more REM it gets). This means that getting enough sleep is not only a good idea but also essential to learning.

Study Abroad students may find their regular sleeping patterns are disturbed by their arrival in a foreign environment, whether by unexpected elements in their physical surroundings (strange bed, noisy neighbours) or by psychological disturbances (culture shock, etc.) caused by the removal of the familiar. They need to be reminded that a good night's sleep is an essential part of the learning cycle.

B9. Stress impacts learning. Moderate stress increases attention. Excessive stress blocks learning.

Being in a new and unusual situation is inherently stressful. The decision to study abroad involves a deliberate choice for a stressful environment, with the understanding that exposure to such an environment will lead to learning. This is true, but only if the stress inherent in the situation can be moderated.

Stress is essentially a survival mechanism. Changes in the environment which may represent danger to the survival of the organism trigger a number of complex neurochemical changes (often known by the short-hand "fight-or-flight mechanism"), principally the release of norepinephrine and cortisol (Ratey, 2008, pp. 62-63). These changes cause the brain to focus on the potential threat, if necessary shutting down other bodily systems not involved in perceiving and analysing the threat. Thus, the hiker who finds herself in a field with a bull will find her senses sharpened, her body providing the energy she will need if she decides to run for and jump over the fence, and non-essential perceptions, such as her

hunger or urgent need to go to the bathroom, shut down. This kind of focus can be a great aid to learning but, if it is taken too far or lasts for too long, can become an impediment to that same learning.

The heightened state of alertness that comes with moderate amounts of stress enhances not only our perception of our environment but also our ability to lay down memories of the situation in which we have encountered something unusual, which the brain interprets as a potential threat (Ratey, 2008). The heightened perception helps us to decide if there is indeed a threat and if so what kind of threat. The enhanced ability to make memories allows us to learn from the situation so that we are better prepared to recognise and react to future, similar situations. In other words, moderate levels of stress make us better able to learn from our environment (Tokuhama-Espinosa, 2011, p. 132).

Stress that is prolonged or frequent, however, has the opposite effects. In their increasing quest for focus and heightened attentiveness the neurochemicals that are released by stress can block the uptake of new information into the brain (Society for Neuroscience, 2007). At this point, learning stops completely and will not re-commence until the source of the stress is either removed or overcome.

In the classroom, one of the roles of the teacher is to recognise when learning-enabling stress is turning into learning-blocking stress and change the students' activity accordingly (Tokuhama-Espinosa, 2014), but a student on a Study Abroad programme usually does not have the luxury of a teacher or counsellor to help with this. Instead, in preparation for the Study Abroad experience, students should be alerted to the heightened possibilities of experiencing stress during the programme and primed with techniques for recognising and moderating their own stress. Publications such as *Managing Stress: Principles and Strategies for Health and Well-Being* (Seaward, 2014) and *The Relaxation and Stress-Reduction Workbook* (Davis, Eshelman, & McKay, 2008) can be recommended to students, along with various online resources (eg. Robinson, Smith, & Segal, 2016).

B11. Feedback is important to human learning.

In a general sense, feedback is any signal from the environment which confirms or disconfirms a person's assumptions about that environment. Since Kelly (2016) has characterised the brain as a "hypothesis-testing machine," the central role of feedback in the learning process is clear. A student in the first days of a Study Abroad experience in the Philippines, for example, after observing

several families, may generate the hypothesis that all families in the host environment have servants. Further observation of other families produces contrary evidence, certain types of families without servants, which would cause modification of the hypothesis. Each round of hypothesis generation – feedback – hypothesis modification brings the student closer to a good understanding of the host environment. As Tokuhama-Espinosa (2014) says: “Feedback triggers the confirmation, negation, new adaptation, or modification of our mental schema, or mindsets” (p. 151).

In formal educational settings, this propensity of the brain to self-correct is buttressed by feedback from peers and teachers. Students are constantly pushed towards learning by receiving feedback on their performance, behaviour and assumptions, whether in the form of grades and test scores, encouragement and praise from a teacher or informal comparison with peers. This social aspect of feedback is consonant with the social nature of human beings (Bargh & Williams, 2006) and is one of the benefits of education in peer groups in schools (Frith & Frith, 2012).

However, in a Study Abroad situation, students often lack access to teachers and even peers. They should be primed to seek out feedback at every opportunity. This can be done partly by giving them an understanding of the hypothesis-testing nature of learning so they will be sensitised to confirmatory and disconfirmatory evidence from their environment, but also by encouraging them to seek out people in their host environment who might be able to provide them with reliable feedback. These people need not be professionals, such as teachers or counsellors. In the early days of a Study Abroad experience, just having someone they can ask questions to can be very helpful. This person could be a “native informant,” a native or long-term resident of the host society, or a near-peer, a fellow Study Abroad student who has had similar but different experiences of the host society. The more such informants a student has, the more the learning process will be speeded and supported.

B15. Support from others is critical to learning.

The social nature of learning has already been touched on in the previous section. It should be clear already that the brain thrives on interaction with others and benefits from the explicit feedback that can come from interaction. On a more elemental level, though, human beings seek companionship (Maslow, 1943). Study Abroad can be an intensely lonely experience. Feelings of isolation

and insecurity are natural when sojourning in a very different society. If not recognised and remedied, these feelings can result in depression, as suggested by the classic W-curve depiction of culture shock (Gullahorn & Gullahorn, 1963), where an initial period of euphoria (the “Honeymoon Stage”) gives way to repeated cycles of depression and recovery.

The consequences for learning can be severe. Depression can block learning in a number of psychological and neurological ways (Tokuhama-Espinosa, 2011), not least by reducing the supply of dopamine and endorphins to the brain, both of which are known to facilitate learning (Berk, 2001; El-Ghundi, O’Dowd, & George, 2007). Thus, unless students receive social and emotional support during their Study Abroad experience, they risk missing out on many opportunities to learn.

Fortunately, such support is more available today than ever before. Traditionally, it is offered by counsellors in the host environment whose job is to take care of the practical and emotional adjustment of Study Abroad students to their new environment. Their first advice is often that students should make friends in the local community. They also see it as part of their job to organise social events where Study Abroad students can get to know each other and mix with interested members of the host community. In recent years, these sources of support have been supplemented by ready access, through social media, to friends and peer groups back home. There is now no shortage of opportunities for social and emotional support, though students may well need advice on how to use these opportunities in a way that enhances their learning about the host community, rather than resulting in a withdrawal from it.

B16. When knowledge is actively constructed by a learner, the learner will be motivated and engaged in learning.

This points to a clear advantage that the kind of informal, experiential learning found in Study Abroad situations has over more formal classroom-based learning. In the classroom there is a danger that knowledge will not be “actively constructed by the learner.” With an increasing focus on testing in many educational systems, there is ever-growing pressure to focus on providing students with distinct, testable chunks of knowledge, rather than encouraging the kind of higher thinking skills that result from the active construction of knowledge by the learner (Tokuhama-Espinosa, 2014, pp. 263-265). Fortunately, in Study Abroad contexts, this risk is small, as few, if any, teachers are involved in the

student's process of learning about the new environment, no test is given on this subject, and students are generally left to their own devices to construct meaning from their changed surroundings.

Further good news for Study Abroad programmes comes from the fact that the active learning process is self-motivating: once the learner is engaged in it, it creates motivation for further active learning, as the brain rewards itself for new learning with dopamine. This means that it is ideally suited to informal learning situations. The role of the teacher/counsellor is mainly in getting the Study Abroad student started on constructing knowledge about the host environment. This can best be done not by providing the frequently used rules and tips for dealing with members of the target culture (eg. Dubai Media, 2012; Van Hinsbergh, 2016) but by encouraging in Study Abroad students the mindset of a cultural ethnographer (Jurasek, Lamson, & O'Maley, 2015) or cultural detective (Nipporica Associates, 2016), intent on figuring out the patterns of behaviour of the host society.

B18. Water is brain food.

This is the simplest dietary advice of all: drink plenty of water. Inspired by the oft-repeated statistic that the brain is more than 70% water (Mitchell, Hamilton, & Steggarda, 1945), several researchers have investigated the effects on the brain of hydration. They have discovered strong evidence that drinking water improves cognition (Edmunds & Burford, 2009) and that, conversely, being mildly dehydrated makes cognitive tasks more demanding (Kempton et al, 2011).

Students who study abroad are particularly susceptible to dehydration, as their regular eating and drinking patterns are disturbed by the change in their environment. They should be given the simple advice that remembering to drink more water will help them to solve the puzzles of everyday living in new surroundings.

B19. The search for meaning is innate in human nature.

The human brain is designed to solve puzzles (Tokuhama-Espinosa, 2011, p. 195). It is predisposed to believe that its environment makes sense and can be understood if enough hypotheses are created, tested against the available evidence, refined and tested again, in a never-ending cycle. When it makes progress in the search for meaning, it rewards itself with a release of dopamine, which not only

stimulates pleasure centres but also facilitates further learning (Wise, 2004).

It is the dopamine rush that makes learning addictive. Once a student has experienced the brain's reward for learning, the student seeks out new opportunities for learning. They seek novelty, and then they look for the patterns in the novelty. They figure it out, learn, and receive a further reward. The resultant craving for learning drives some students to look for ever more novel situations and, ultimately, to study abroad. The virtuous circle of exploring and learning is self-sustaining to the extent of being addictive.

Those who work with students to help them through their Study Abroad experience should mainly be concerned with removing artificial barriers placed in the way of learning by formal school systems and misconceptions about what it means to study abroad, by forewarning and fore-arming students about the kind of thoughts and emotions they will experience whilst abroad. Once the barriers are removed, the brain will naturally seek out novelty, puzzle out its meanings and reward itself for success.

Practical Implications

This exploration of how people learn from the everyday experience of Study Abroad programmes leads quite naturally to a number of suggestions for those who work with Study Abroad students, those who are about to study abroad and those who have returned from abroad.

Pre-departure

1. Give practical advice

There is a certain amount of practical advice that can be given to students before they travel abroad. This advice should help them to keep both brain and body fit and ready to learn:

- a. Sleep well
- b. Eat well
- c. Drink plenty of water
- d. Manage your stress

2. Teach key concepts

There are also concepts that can be taught explicitly in order to help students better understand and learn from their Study Abroad experience:

- a. Suspension of judgment
- b. Avoidance of stereotypes
- c. Hypothesis generation and testing
- d. How the brain learns from its environment

While Abroad

1. Friends and contacts

Students should be encouraged to seek out people who can support them, practically, emotionally and as learners:

- a. "Native informants"
- b. Other Study Abroad students
- c. Study Abroad counsellors
- d. Friends back home, especially those who have had Study Abroad experiences

2. Reflection

Students should be encouraged to reflect consciously on the new experiences they are having, by:

- a. Journaling / blogging
- b. Asking questions, seeking answers
- c. Generating and testing hypotheses

3. Manage Stress

The need to manage stress is most acute in the early days. On top of pre-departure advice on stress-management, a list of books, pamphlets and websites students can consult should allow them to access help when they need it.

On Return

1. Ongoing Reflection

The learning does not stop when students return home. In some ways the most important stage of learning occurs after the Study Abroad programme finishes, as students integrate new ideas and new experiences into former lives. They should be encouraged to continue:

- a. Reformulating hypotheses (about both home and abroad)
- b. Reviewing assumptions (ditto)
- c. Dialoguing with supportive friends and contacts

2. Seeking Feedback

The pace of new experiences should be less frenetic upon return to the home campus. This is a good time to encourage students to broaden and deepen their understanding of what they have learned, by:

- a. Reading
- b. Talking with other returnees and Study Abroad students at the home campus
- c. Talking with counsellors

3. Planning the Next Adventure

After all, being in new places is highly addictive

None of these ideas is particularly new, but the research emerging from the field of Mind, Brain, and Education gives us clearer reasons than ever to re-emphasise these particular activities, in our quest to ensure that students gain the maximum possible learning benefits from their Study Abroad experience and beyond.

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