

The Curious Case of Innovative Minds: An Analysis of the World's Most Creative People's Discourse

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ABSTRACT

Novelty is the bread and butter of creativity and innovation. In order to embrace novelty in the classroom, the seeds of curiosity through the promotion of inquisitive thinking should be cultivated. Previous studies that experiment the incorporation of inquisitive thinking in the classroom indicate that it has made the learning more meaningful and valuable to students. The present study seeks to investigate the significance of inquisitive thinking in its role to promote creativity and innovation by analysing the discourse of the five randomly selected most creative people in the world as listed by an online business magazine, FastCompany.com. The findings have verified the importance of the inquisitive thinking represented through the formation of interrogatives or questions in every one minute of each of the five speeches. This has evidently highlighted the importance of inquisitive thinking in the paths of creativity and innovation.

Keywords: *novelty, curiosity, inquisitive thinking, neurogenesis, creativity*

Introduction

Recently, the Malaysian Human Resource Minister, Dato' Seri S. Subramaniam lamented the lack of creativity and critical thinking skills among the local graduates which has further caused their low marketability as a result of the foreign employers' and companies' reluctance on recruiting them (*Think critically, graduates*, 2010). This problem might have taken its root in the years of schooling where learning is all about getting the right answers without even thinking why false answers are false. Holt (1982) believed that the school becomes the place where students learn to be stupid as they would "do the task stupidly – even if correctly" (Holt, 1982, p. 263). The danger of focusing on learning for the right answers is that it might trigger boredom which would kill the interests in learning as the mental capacity is not fully utilised. Based on a research done at 31 secondary schools in England investigating students' attendance, it was found that better attendance rate was determined by students' interests in the school lessons (*Boring lessons linked*, 2007).

Apart from this, the mind that is not challenged will also cause boredom which will eventually prompt students to leave schools. Out of boredom of learning the basics of reading, writing and counting, the Malaysian seven-year-old genius who can solve Additional Mathematics problems, Adi Putra Abdul Ghani, could be expelled from his school as a result of his frequent absence (Koh, 2006). Furthermore, a study funded by the Bill & Melinda Gates Foundation, *The Silent Epidemic: Perspectives of High School Dropouts* reported that almost 50 percent of 470 dropouts left school because their classes bored them and perceived to be irrelevant to their lives and ambitions (*Most dropouts leave*, 2006). This waste of human talent is a huge loss to the country as every school dropout is like a failed investment that wastes a lot of potentials and resources.

Thus, the present study seeks to uncover the solution to this disease in the learning field. Perhaps the answer lies in the minds of the creative people as the living proof of the successful use of critical thinking. The research will also question the significance of curiosity that lies in the inquisitive thinking that patterns their speeches and drives their creative minds.

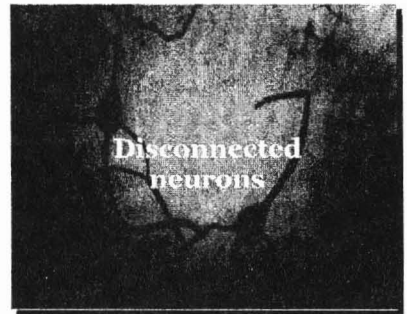
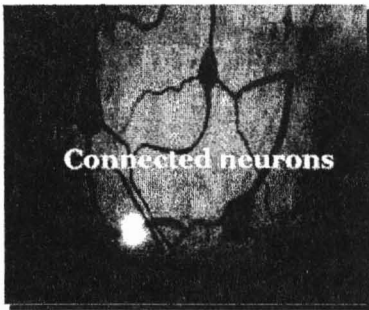
The Grey and White Matter

The brain is an amazing gift of nature that explains how the mind can be supportive or hostile to innovation by understanding the neuroscience of boredom and its connection to novelty and neurogenesis.

The Neuroscience of Boredom

In order to understand the threat that boredom poses to the human mind, it is important to know what happens in the brain when someone is bored. Equipped in the human brain are “a hundred billion neurons” triggering fireworks of information transferred through their tentacle-like dendrites with “10,000 other neurons” (Arden, 2010, p. 6).

Figure 1: The neuron connections in the human brain



Acting as the messengers, these neurons carry electrical signals every time they are stimulated by the senses. It is really important to maintain the neural connections as it shows that the neurons are talking to each other and this guarantees the transfer of information. However, as the mind is not utilised to think, it causes the attention to deteriorate which results in the failure of neuron connections. This is indicated by a study conducted at the University of Michigan where the researchers discovered that boredom caused several areas of the brain to be disconnected (Vieru, 2008). Jensen (2006) also supported this discovery that there is a significant correlation between boredom and dendrites of brain cells in which the greater the boredom, the poorer the dendrites will be.

Novelty and Neurogenesis

To alleviate boredom, neurons need to remain connected by keeping the mind active. The key to achieve this lies in novelty, the sibling of creativity and innovation. Rooted from the word *nova*, both novelty and innovation are defined by “the quality of something new” (*Longman Dictionary of Contemporary English*, 2005, p.1122). In addition, the new entity is not without the action of *create*, the base form of creativity which is the ability of producing something that has never existed before. Thus, creative thinking encourages the mind to establish new connections (Wheeler, 1998). These new connections will trigger neurogenesis or the birth of new cells as the neurons will attempt to connect to one another “to encode the ideas and images” (Arden, 2010, p. 9).

Jensen (2006) mentioned that novel learning is the pillar of the growth, survival and functionality of the neurons. Previous studies have shown that increased neurogenesis occurred within the animals that lived in the environment that provided the opportunity to discover new things or learn new skills. For instance, lab rats which were placed in a cage with a maze were found to have more complex dendrites than the free roaming rats (Jensen, 2006). The complexity

of the dendrites occurred as the rats acquired the skills to escape from the maze. Hence, this shows that novelty plays a significant role in the promotion of neurogenesis.

Curiosity and Innovative Thinking: The Fuel for Novel Learning

The Universal Law of Gravitation has been the living proof of the power of curiosity through inquisitive thinking. It is one of the world's most significant breakthroughs fueled by Newton's tendency to question about things as Bernard Baruch said "Millions saw the apple fall, but Newton asked why" (*Curiosity Quotes, Sayings about Wonder*, n.d.). This separates Newton from the others as human beings possess the same sight, sound, touch, smell and feel surrounding them but only those who manage to query about the experiences will seize the opportunity to innovate. The activation of inquisitive thinking can be achieved through the cultivation of the seeds of creativity and innovation that involves classroom learning. Curiosity which generates inquisitive thinking triggers questions that drive it to be on an endless quest in search of the answers.

Previous studies have shown that inquisitive thinking plays an important role in education. The classroom learning in Asia which relies heavily on the domination of teachers has restricted the students' creative potentials. As a result, the traditional curriculum is reformed and the element of creativity is incorporated into the latest Science syllabus. To evaluate the newly implemented curriculum design adopting the creative thinking element, Cheng (2010) administered 2 sets of questionnaire investigating the significance of creative learning to students of Form 2, 3, and 4. The findings indicated that about 60 to 65% of students felt that they managed to develop their curiosity in the newly creative thinking based curriculum as they had the opportunity to care and explore things that surrounded and interested them. In addition, using a set of questionnaire, Chak (2007) discovered that the parents and particularly teachers, being the people who were responsible in the lives of the children, were more likely to promote inquisitive thinking as it was perceived to be important in their intellectual development. This is also evident in Perkiomen's (2001) study as he discovered that as his seventh grade students started to ask questions, they became more focussed and productive. This had developed their minds to be creative and analytical. Their interests in the subject had also driven their desire to learn.

The learners' burning desire to learn is the impetus to novel learning. Knodt (2009) believed that inquisitive thinking encourages creative and innovative thinking based on the remarks of an open-inquiry learning lab for K-6 students. It was found that as the students' inquisitive thinking was triggered, they valued what they were learning as they said "I learned that life is not just handed to you--you've got to figure it out" and "Challenges wake your brain up!" (Knodt, 2009, pp. 15 - 16). In addition, they also experienced the joy of inquisitive learning illustrated through their remarks like "I wish I lived here" and "Your mind opens up and you want to do all these different things!" (Knodt, 2009, pp. 15 & 22). These positive remarks reflected their eagerness to explore new possibilities and solutions which are accommodative of creativity and innovation.

The Study

Method

The initial stage of the present study involved obtaining the list of the most creative people around the world from an online business magazine, *FastCompany.com*, which aims at driving the creative people to the cutting edge of innovation. The list consisted of 100 creative people from various fields in 2009. The decision to select the list of creative people in 2009 instead of 2010

was taken to allocate more time for the discourse analysis to take place. The next stage dealt with the selection of five out of the 100 creative people for the purpose of analysis. This selection was made on the bases of the availability of their talks online and the quality of the recordings. Finally, the discourse of these selected creative people was obtained from the websites that offer free talks like *ted.com* and *poptech.org*. The focus of the analysis was navigated towards the signs of curiosity that pattern their speeches and drive their creative minds. Zion and Sadeth (2007) as well as Perkiomen (2001) found that students signalled curiosity through the formation of questions or interrogatives. In order to highlight the importance of the interrogatives in the present investigation, their appearance was recorded and the time average of each occurrence was calculated. In addition, some keywords and phrases which are synonymous to curiosity were also identified and recorded to demonstrate the importance of the interrogatives in the paths of creativity and innovation.

Sample

The selected five most creative people were drawn from various different fields. On top of the list is Jonathan Ive, the Lead Designer of Apple Company who was driven by the challenge to solve the design problem of combining different parts with different attributes to produce one best part. His designs are among the world's most best-selling gadgets which are the i-Phone, i-Mac, i-Pod and MacBook. Next on the list is Shai Agassi, an environmental enthusiast who has innovated electric cars; one of the most remarkable inventions that has witnessed a shift in the global morality. His agenda was based on the challenge of producing convenient and affordable cars though restricted by some limitations of science and economy. Ranked 14th among the creative people in the world is J.J. Abrams, a media mogul who was inspired by the element of mystery which has triggered the creation of a number of award-winning television series like *Lost*, *Alias* and *Star Trek*. The fourth selected innovator is Neri Oxman, an architect who used nature as the pillar of her innovation and was placed 43rd on the list of 100 most creative people, for inventing *materialecology*. Ranked 80th among the creative people is the fifth and the final innovator chosen for the study, Jane McGonigal, a game designer who was fascinated by the idea of solving the world's problems through online games. The youngest among the other innovators, she has produced among the mostly played online games utilising real-life situations which are *World of Warcraft*, *Superstruct*, *Top Secret Dance Off*, *I Love Bees*, *A World Without Oil* and *The Lost Ring*. Table 1 below summarises the details of the study sample.

Table 1: Summary of the study sample

No	Rank	Creative People	Age	Profession	Innovation
1.	1	Jonathan Ive	43	Industrial Designer	i-Mac, i-Phone, i-Pod, MacBook
2.	3	Shai Agassi	42	Software Entrepreneur	Electric Cars
3.	14	JJ Abrams	44	TV Producer / Screenwriter / Director / Actor	<i>Lost</i> , <i>Alias</i> , <i>Star Trek</i>
4.	43	Neri Oxman	34	Architect	<i>Materialecology</i>
5.	80	Jane McGonigal	33	Game Designer	<i>World of Warcraft</i> , <i>Superstruct</i> , <i>A World Without Oil</i>

Findings and Discussion

The analysis of the data was geared towards the signs of curiosity displayed by the selected creative people. Such signs included the uses of interrogative sentences as well as specific keywords and phrases that point out the significant role of curiosity on creativity and innovation.

1. Interrogative Sentences

The use of interrogative sentences signifies the essence of curiosity. As the aim of such sentences is to seek information, so does curiosity that is to discover the unknown or the new piece of information. Characterised by the use of some tools to ask questions such as the WH- questions and the auxiliary verbs, these sentences end with a question mark (?). A similar pattern appeared in all the five innovators' discourse is that interrogative sentences seemed to dominate the speeches. The importance of these sentences is illustrated by the formation of each question for an average of every 1 minute of speech as described in Table 2.

Table 2: Time average of question formation

No	Creative People	Speech Duration	Question Formation (Time Average)
1	Jonathan Ive	7 minutes 47 seconds	1 minute 75 seconds
2	Shai Agassi	19 minutes 09 seconds	1 minute 05 seconds
3	JJ Abrams	18 minutes 02 seconds	0 minute 9 seconds
4	Neri Oxman	20 minutes 43 seconds	0 minute 7 seconds
5	Jane McGonigal	20 minutes 32 seconds	1 minute 17 seconds

Oxman and Abrams used questions most frequently in which each question appeared in less than 1 minute. This has evidently highlighted the importance of questions and showed that it has been a great influence on their creativity and innovation. Before utterances are produced, it is the thought that processes them. Levelt (as cited in Harley, 2008) mentioned that speech production involves 'conceptualization' which is the 'pre-verbal message' as "the speaker determines the message of his speech" (Harley, 2008, p. 397). According to Gellatly and Zarate (1998), Wernicke's model showed that "speech moves from thoughts to words through a bundle of fibres called the arcuate fasciculus, transferred into sounds and later into muscle commands" (Gellatly & Zarate, 1998, p. 63). Table 3 below describes the uses of WH-questions and auxiliary verbs to interrogate the listeners. All the innovators used WH- questions. Agassi and Abrams used only WH- questions in their speech such as 'how', 'what' and 'why'. Apart from WH- questions, Ive, Oxman and McGonigal included the auxiliary verbs such as 'can', 'do', 'is' and 'are'.

Table 3: List of interrogative sentences

No	Innovators' interrogative form of spoken discourse
Jonathan Ive (Hustwit, 2009)	
1.	" Why, why is it like that? Why is it like that and not like this?"
2.	" How do you connect to the product?"
3.	" Why wouldn't it be any other way?"
4.	" Can we do the job of those six parts with just one?"
Shai Agassi (Shai Agassi: A bold, 2009)	
1.	" How do you run a country without oil?"
2.	" How do you scale this so that it can become something that is used by 99 per cent of the

No *Innovators' interrogative form of spoken discourse*

- population?"
3. "How do you do this still within the boundary of the science that we know today?"
 4. "How do you do it within the economics that we have today?"
 5. "How do you do it from the power of the consumer up and not from the power of any of it deep down?"
 6. "What happens when the battery is disconnected from the car?"
 7. "What is the cost of that battery?"
 8. "Why?"
 9. "What is the problem to come up to the US?"
 10. "Why, why is this a big issue?"
 11. "What happens at that point?"
 12. "What if we had proven that in the same space we have found oil for the country for the next hundreds of years?"

JJ Abrams (*JJ Abrams: The mystery, 2008*)

1. "What the hell's in that island?"
2. "Why so many mysteries?"
3. "What is it about mystery that I seem to be drawn to?"
4. "What to talk about at ted?"
5. "What should I talk about?"
6. "What do I talk about?"
7. "Why do I do so much stuff involves mystery?"
8. "Why do I any of it that I do?"
9. "How it works?"
10. "Why it works?"
11. "What it is?"
12. "Why have I not opened this?"
13. "Why have I kept it?"
14. "Why haven't I opened this?"
15. "What could this thing be?"
16. "What are you going to write worthy of me?"
17. "What are stories but mystery boxes?"
18. "What is inside you?"
19. "What comes next?"

Neri Oxman (*Neri Oxman: On designing, 2010*)

1. "What is the origin of form?"
 2. "How do we invent form?"
 3. "Where do we begin?"
 4. "How do we think of generating a product and building a city, a piece of clothing?"
 5. "How do we start to think about this process?"
 6. "Is it a preconceived image of the narrative?"
 7. "Do we design form by immaculate conception?"
 8. "Is it a matter of getting rid of the stone that is in the way as Michelangelo once pointed?"
 9. "Is it an idea about technology and optimization and function?"
 10. "How is that function tested, evaluated, validated?"
 11. "According to whom?"
 12. "By which criteria?"
 13. "How do we begin to think about natural design?"
 14. "How do we put design on his head?"
 15. "What can nature do for us?"
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No	Innovators' interrogative form of spoken discourse
16.	"How do we begin to think of a natural way to design?"
17.	"Can we think about a nature 2.0 initiative?"
18.	"What does it mean to beat nature today?"
19.	"What does it mean to design in a sustainable way?"
20.	"How are those ideas from the world of art and the world of design come to portray in more practical applications in the medical industry and also in technology?"
21.	"What can design do for science?"
22.	"What can design do for technology?"
23.	"How do you define one component in the glove which reacts to pain?"
24.	"How do we now reconsider how we reinvent our technology for construction?"
25.	"How to now take some of those ideas and generate a new technology that would cater for more sustainable way of making and doing things?"
26.	"Can we print buildings as if we were 3d printing bones?"
27.	"Can we save that 50% of the material?"

Jane McGonigal (Jane McGonigal: Gaming, 2010)

1. "Why we are better in games than we are in the real life?"
2. "What about games make it impossible to feel that we can't achieve everything?"
3. "How can we take those feelings from games and apply them to the real world work?"
4. "Why we are there?"
5. "What we are doing?"
6. "How much time we are currently investing in playing games?"
7. "What these games are making us so virtuosos?"
8. "What exactly are gamers getting good at?"
9. "Why people are investing so much time and energy and money in online world?"
10. "Are we on the threshold of our own epic game?"
11. "How are we going to solve real world problems in games?"
12. "How much oil costs?"
13. "What's not available?"
14. "How food supply is being affected?"
15. "How transportation is being affected?"
16. "How you would live your real life as if this were true?"
17. "What do you think happens next?"

2. Keywords and Phrases

Another similar trait that is shared by all the five creative people is that they are eager to meet and solve challenges. This is reflected by the use of some keywords or phrases that highlight the significance of curiosity. As illustrated in Table 4, words like 'puzzle', 'mystery', 'question' and 'ask' seem to serve as stimuli to satisfy curiosity by the need to seek further information. In fact, the word 'curiosity' is even utilised by Abrams as his creativity was triggered by his curiosity and fascination with mysteries. For Agassi, solving a real world problem is like solving a puzzle which requires an effective solution. Thus, the mind needs to be 'constantly looking at something and thinking', 'figuring out', 'wondering around' and 'searching for answers' as demonstrated in the innovators' countless attempts in discovering the solution.

Table 4: List of keywords and phrases

No	Innovator	No	Keywords
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1	Jonathan Ive	1. ...you're constantly looking at something and thinking ... 2. It was figuring out process...
2	Shai Agassi	1. That's the question that sort of hit me in the middle of a devil's afternoon about four years ago 2. ...and it never left my brain so I start to play with it like a puzzle ... 3. ...through a process of wondering around ... 4. ...we look at the question of the affordability...
3	JJ Abrams	1. ...is a good question ... 2. ...this incredible curiosity ... 3. ...a giant question ... 4. ... mystery is the catalyst for imagination... 5. ... mystery is more important... 6. ...a fundamental question ... 7. ...a big question ... 8. ...there's another question ... 9. ...the question of...
4	Neri Oxman	1. so for many years now, it's been many years I've been asking myself 2. this one simple question ... 3. so I began by searching for answers in nature 4. so the next question is... 5. so I always ask ... 6. again the question of dynamic range...
5	Jane McGonigal	1. so the big question ...

Research Implications

The findings of the present study have some profound implications for the development of creativity and innovation. A journey of a thousand mile begins with a single step. For starters, providing innovation-friendly environment not only in the classroom but also in the workplace settings is extremely crucial in order for creative thinking to develop. Creating wide opportunities in the cultivation of curiosity is also supportive of the existence of such environment.

Firstly, hosting an environment that is innovation-friendly can be done by encouraging inquisitive thinking through the formulation of questions that can promote the growth of curiosity. As the purpose of asking questions is to seek information, the process of searching for the answers signifies curiosity that drives the endless quest to discover the unknown or the new piece of information. Thus, learning is more effective when the minds are actively engaged.

Secondly, the fact that the word 'innovation', rooted from the word *nova* and defined as 'new' makes exploring new ideas and skills the essence of creative thinking. When it comes to discovering something new, it has never ceased to amaze the mind that is aroused by curiosity. By embracing new ideas and skills, it encourages the mind to establish new connections (Wheeler, 1998) which will trigger neurogenesis or the birth of new cells as the neurons will attempt to connect to one another 'to encode the ideas and images' (Arden, 2010, p. 9).

Apart from that, once the neurons are connected, passion and interests will be ignited. This happens as the neural connections show that the neurons are talking to each other and this guarantees the transfer of information. Therefore, as the individuals are passionate in what they do, they tend to value and appreciate things that revolve around them. As a result, the passion and interests will further invite the positives that reflect their eagerness to explore new possibilities and solutions which can also promote creativity and innovation.

Finally, as creativity encourages the embrace of new things, it also enables the creation and maximisation of human potentials. An innovation-friendly environment should be supportive

of new challenges and solutions. Everyone deserves to be given sufficient opportunities to improve themselves and develop their talents. Being innovative is all about continuous learning that can help unleash human potentials. With sufficient room for ideas to breathe and talents to develop, everyone is entitled to contribute to the innovative environment.

Conclusion

To keep up with the rapid growth of technological creation in this world which defines 'development', a country may need to depend on the boosts of creativity and innovation. This can be achieved by cultivating the seeds of creative and innovative thinking in the ground of learning institutions. Such act of cultivation requires the implementation of active thinking. As the mind is activated with the formulation of questions, it becomes continuously engaged and committed to find the answers. This process of finding the answers may fuel the creative and innovative thinking. Hence, encouraging the existence of the inquisitive element in the students' minds might help to stimulate curiosity that helps to nurture creativity and innovation.

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