

The Aim of this Investigation:

To compare the capabilities for divergent thinking amongst sixth year students who excel in certain subjects.



Introduction

Our experiment was inspired by the works of a group who investigated divergent thinking, whose findings were published in the book, "Break Point and Beyond – Mastering the Future of Today" by George Land and Beth Jarman.

The question we're asking:

- Do certain school subjects nurture divergent thinking better than others?

What's Divergent Thinking?

Not to be confused with creativity, which is defined as the process of having original ideas that have value.

Divergent thinking is explained by well-known educationalist Sir. Ken Robinson as:

- An essential capacity for creativity.
- An ability to see many possible answers to a question.

- To think in a more lateral rather than vertical way.



What's Divergent Thinking?

- The experiment written up by George Land and Beth Jarman compared the capabilities for divergent thinking among different age groups with 1500 participants.
- Their findings were that as people got older, they became weaker at divergent thinking.

Our Experiment

- We tested 30 Leaving Cert. students on their ability for divergent thinking.
- Each of these students were deemed to be the excelling students of their year group in their strongest subjects, based on exam results held by the school.
- Certain subjects were put into different categories, as shown in the next slide.
- Essentially, rather than stratifying the participants into age groups, we stratified our participants, who are of similar age, into their strongest fields of study in school.

Our Experiment

- 5 students from each subject category were interviewed, with the questions shown on the next slide.

Our Hypothesis:

Students who excel in art-orientated subjects are more likely to be stronger at divergent thinking than those who excel other fields.

Maths-Orientated	Arts-Orientated	Business-Orientated	Memory Based	Languages	Sciences
Maths	English	Accounting	Geography	French	Biology
Applied Maths	Art	Business	History	Spanish	Chemistry
	Music	Economics		Irish	Physics

The Questions

1. Represent the number "150" in as many ways as you can think of. (1 minute time limit)
2. Describe an apple. (1 minute time limit)
3. Think of as many uses as you can for a paperclip. (1 minute time limit)
4. Create whatever comes to mind with a pen and a sheet of paper. (1 minute time limit)
5. Give the wrong answer to a series of easy questions. (10 questions)

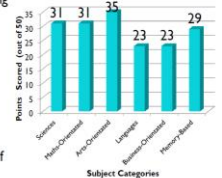
The Interviews

- We questioned each participant individually in an interview that lasted 8-10 minutes.
- Participants weren't told what the survey was about, as it might affect how they answer the questions.
- Each were given a guarantee of confidentiality and the freedom to "think outside the box".
- Participants could be awarded 10 points maximum for each question.
- The marks were then accumulated for each subject category, with 5 participants in each category.

"150" Representation Results

A possible 5 marks were awarded for variety of methods and a possible 5 marks for quantity of answers.

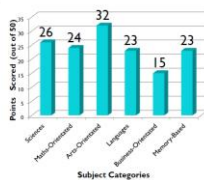
- Eg- a person who came up with 20 ways of making 150 using only addition would score high in quantity but low in variety.
- Marks were also rewarded for those who thought outside the confines of maths, eg- writing 150 in a variety of languages.



Apple Description Results

10 marks were awarded for originality/variety of description. Marks were awarded for those who gave in-depth physical descriptions of an apple, as well as those who explained uses for apples, or their cultural significance, rather than just very obvious physical features of an apple.

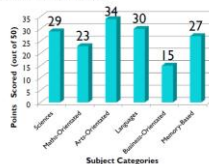
- For example:
- More marks were awarded for "used for apple pie", "part of the garden of Eden story".
 - Less marks were awarded for "it's red", "it has a stalk".



Paperclip Uses Results

Responses were marked out of 10; 5 marks for originality/variety, and 5 marks for quantity of uses. More marks were awarded to those who thought outside the confines of principal uses of a paperclip. Some marks were also given for listing the obvious uses of a paperclip.

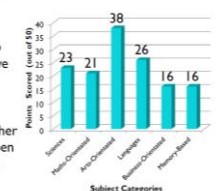
- Eg- "a tightrope for ants" would score higher than simply stating that it holds paper together.



Pen and Paper Results

Participants were marked out of 5 marks for originality, and out of 5 marks for their ability to exploit the pen and paper in various/creative ways.

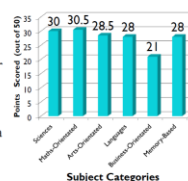
- Eg- Drawing a stick man may be original in that no other participant may have done it but making a "scaled-down homeless shelter" with a pen as a support beam, scores higher points as it exploits the pen and paper in creative and constructive ways.



Wrong Answer Quiz Results

10 questions were asked with a maximum of 1 mark awarded per question.

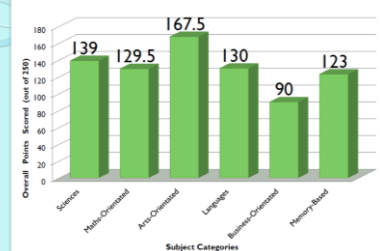
- For example: "what is the capital of France?".
- No marks were awarded for the right answer or a previously said answer.
 - Half marks were awarded for a wrong answer related to the question. For example, "Lyon".
 - One mark was awarded for a completely unrelated and wrong answer. For example, "fish paste".



Final Results

- Unsurprisingly the arts-orientated group scored the highest overall cumulative mark, confirming our hypothesis.
- Interestingly, business related subjects were among the lowest scoring.
- There was quite a drop in score between the sciences and the arts-orientated subjects.
- Surprisingly, maths scored a little bit less than the languages.

Final Results



How could we improve our investigation?

- The majority of our participants were Catholic private school students.
- A bigger, more representative sample of different social backgrounds, religion and ethnic origin would prevent the investigation from being biased.
- More questions could be asked, to provide more results to analyse.

How could we improve our investigation?

- Unfortunately, no more than approximately 10 minutes of the participants' time could be taken without giving some sort of incentive to take part.
- Also, certain participants were likely to excel in a variety of subjects, not solely the categories we placed them in.

Conclusion/Further Analysis

- Although our experiment wouldn't contain sufficient data to explore a subject as complex as divergent thinking, we feel that developing this experiment on a wider scale, i.e.- different schools, testing university students etc, could help in answering many interesting questions.

Conclusion/Further Analysis

- For example, should there be more emphasis on creativity or divergent thinking, particularly in maths, business and science related subjects?
- Could developing divergent thinking, rather than simply having to "learn off" produce better problem-solvers?
- Should we restructure certain courses so that more emphasis is placed on divergent thinking?

Thank you for reading!

By:
• Aidan Mulloy
• Brian Fallon

of Blackrock College.