

**Effects of Neuroscience-Based Thinking (NBT) and
Thinking Skills (TS) Strategies on Thinking and
Emotion among Primary Schools Pupils**

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

In the Name of Allah. Most Gracious, Most Merciful

إِن الْحَمْدَ لِلَّهِ، نَحْمَدُهُ، وَتَسْتَغِينَهُ، وَتَسْتَغْفِرُ وَلَا تَعُوذُ بِاللَّهِ مِنْ شُرُورِ أَنْفُسِنَا، وَسَيِّئَاتِ
أَعْمَالِنَا مَنْ يَهْدِهِ اللَّهُ فَلَا مُضِلَّ لَهُ، وَمَنْ يَضِلَّ فَلَا هَادِيَ لَهُ، وَأَشْهَدُ أَنْ لَا إِلَهَ إِلَّا اللَّهُ
وَحْدَهُ لَا شَرِيكَ لَهُ، وَأَشْهَدُ أَنَّ مُحَمَّدًا عَبْدُهُ وَرَسُولُهُ.

Verily all praise is for Allah, we praise Him and seek His aid and ask for His forgiveness, and we seek refuge with Allah from the evils of ourselves and our evil actions. Whomever Allah guides there is none who can misguide him, and whomever Allah misguides there is none who can guide him, and I bear witness that none has the right to be worshipped except Allah Alone, having no partner, and I bear witness that Muhammad is His slave and His Messenger.

DEDICATION

In the name of Allah, this completed work is dedicated to my beatitude, parents, whom donated to me their greatest love. This thesis is also dedicated to my life companions, my two wives. Delight of my eyes, my daughter Maymoona. I didn't forget all my whole brothers and sisters, whom I learned from them the meaning of the cooperation.

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TABLE OF CONTENT

Content	Page
Dedication	III
Acknowledgments	IV
Table of Content	V
List of Tables	XVI
List of Figures	XXI
Glossary of Abbreviations	XXII
Abstrak	XXIII
Abstract	XXIV
CHAPTER ONE: Introduction	1-32
1.1 Introduction	1
1.1.1 Field of Neuroscience	2
1.1.2 Thinking Skills	5
1.1.3 Neuroscience Based Thinking (NBT)	8
1.2 Background of the Education System in Malaysia	9
1.3 Problem Statement	11
1. 3.1 The Status of Integration of Neuroscience Principles in the current Curriculum	11
1. 3.2 Lack of Thinking Skills in pupils	13
1.4 Objective of Study	18
1.5 Research Questions	19
1.6 Research Hypotheses	20
1.7 Significance of the Study	22

1.8 Rationale of the Study	25
1.9 Definitions of Terms	29
1.10 Limitations of the Study	31
CHAPTER TWO: Literature Review	33-131
2.1 Introduction	33
2.2 The Neuroscience and Brain	33
2.2.1 Relevant between Brain structures and its Functions	33
2.2.1a Main Components of The Human Brain	35
2.2.1b The Cerebral Hemisphere Lobes	36
2.2.1c The Neurons of the Human Brain	37
2.2.1d Executive Function of Prefrontal Lobe	40
2.2.1e Human Brain Creativity and Learning	41
2.2.2 Human Brain Development	43
2.3 Applying Neuroscience in Education	46
2.3.1 Theories of Neuroscience and Education	47
2.3.1a Piaget Theory of Cognitive Development	47
2.3.1b Hebbian Theory of Learning	49
2.3.2 Application of Cognitive Neuroscience in Psychology and Education	52
2.3.3 Applying Neuro Linguistic in Education and Thinking	55
2.3.4 Disadvantages of Integrating Neuroscience in Education	56
2.4 Principles of Neuroscience in Education	57
2.4.1 Principles of Cognitive Neuroscience	58
2.4.2 Principles of Neuro Linguistic	69

2.5 Creative Thinking	76
2.5.1 Defining Creativity	76
2.6.2 Creativity Theories	78
2.5.3 Creative Thinking Skills	80
2.5.4 Measuring Creativity	81
2.6 Critical Thinking	83
2.6.1 Defining Critical Thinking	83
2.6.2 Critical Thinking Theories	84
2.6.3 Critical Thinking Skills	86
2.6.4 Measuring Critical Thinking	88
2.7 Relationship between Creative and Critical Thinking	88
2.7.1 Pertinence between Creative and Critical Thinking	88
2.7.2 Model of Interpenetrated Creative Thinking and Critical Thinking	92
2.7.3 Scientific Thinking	94
2.8 Learning of Emotion	97
2.8.1 New Pedagogies	97
2.8.2 Emotions and Brain	99
2.8.3 Model of Emotion	100
2.9 Interpenetration of Neuroscience and Thinking	102
2.9.1 Brain Structures and Thinking	102
2.9.2 Model of Interpenetrate Neuroscience and Thinking	103
2.10 The Effects of Neuroscience Based Thinking	105
2.10.1 The Effect of Neuroscience Based Thinking on Students Thinking	107

2.10.2 The Effect of Neuroscience Based Thinking on Students	113
Emotion	
2.11 Learning and Thinking in Science Curriculum	118
2.11.1 Thinking in Science Subject	120
2.11.2 The Thinking in Malaysian Science Education	121
2.12 Gender differences	123
2.12.1 Gender differences on Thinking	125
2.12.2 Gender differences on Emotion	126
2.13 Conceptual Framework of the Study	128
CHAPTER THREE: NBT and TS Strategies	132-173
3.1 Introduction	132
3.2 Perspectives of Instructional Strategies	132
3.3 Implications of Thinking Strategies in the Curriculum	134
3.4 Neuroscience-Based Thinking (NBT) and Thinking Skills (TS)	138
Strategies	
3.4.1 Origins of Neuroscience Principles in NBT Strategy	138
3.4.1a Merging Principles of Cognitive Neuroscience in NBT	138
strategy	
3.4.1b Integrating Principles of Neuro Linguistic Programming	140
Through NBT Strategy	
3.4.1c Relevance between Cognitive Neuroscience and Neuro	141
Linguistic in NBT Strategy	
3.4.2 Origins of Thinking Skills in NBT and TS Strategies	142
3.4.2a Creative Thinking Skills	142

3.4.2b Critical Thinking Skills	143
3.4.2c Integrating Creative Thinking Skills and Critical Thinking Skills in the NBT and TS Strategies	143
3.4.3 Interactions of the NBT and TS Components	145
3.4.4 Models of NBT and TS Strategies	147
3.5 Framework of NBT and TS Strategies	150
3.6 NBT and TS Tools	151
3.6.1 The Importance of NBT and TS Strategies	151
3.6.2 The Goals of NBT and TS Strategies	152
3.6.3 Building and Preparing of the NBT and TS tools	152
3.6.3a Introduce Brochure and Implementation Guide of the NBT and TS Strategies	153
3.6.3b Preparing Lessons Plans of the NBT and TS Strategies	154
3.7 The Implementation of the Neuroscience Principles and Thinking Skills in Strategies	157
3.7.1 Neuroscience-Based Thinking Strategy (NBT)	160
3.7.1a Implementing the Neuroscience Principles and Thinking Skills in NBT Strategy	160
3.7.1b The NBT Strategy's Procedures	164
3.7.1c Teacher and Pupils' Roles during Lessons of NBT Strategy	165
3.7.2 Thinking Skills Strategy (TS)	167
3.7.2a Implementing the Thinking Skills in TS Strategy	167
3.7.2b The TS Strategy's Procedures	168
3.7.2c Teacher and Pupils' Roles in Thinking Skills Strategy	168

3.7.3 Employing the Syllabus in NBT and TS Strategies	169
3.7.4 Prevalent Strategy (P)	171
3.8 Summary of the Differences among NBT, TS and P Strategies	171
CHAPTER FOUR: Methodology	174-204
4.1 Introduction	174
4.2 Research Design	174
4.3 Population	177
4.4 Research Sample	178
4.5 Controlling the Factors	178
4.6 Onset Academic Exam	181
4.7 Treatments of the Study Groups	182
4.8 Research Variables	183
4.9 Research Instruments	184
4.9.1 Science Tasks of Thinking and Emotion	184
4.9.1a Items and Scoring Procedures of Science Tasks of Thinking and Emotion	186
4.9.1b Protocol Implementation of Science Tasks of Thinking and Emotion	187
4.9.2 Questionnaire of Creative Thinking	189
4.9.2a The Items and Scoring Procedures of Creative Thinking Questionnaire	191
4.9.2b The Protocol of Implementation of Creative Thinking Questionnaire	195
4.9.3 Validity and Reliability of Instrument	196

4.9.3a Validity of the Study Instruments	196
4.9.3b Reliability of Study Instruments	196
4.10 Data of the Study	197
4.10.1 Data Analysis	198
4.10.2 Data Collecting Procedures	200
4.11 Research Procedures	201
4.12 Summary	203
CHAPTER FIVE: Pilot Study	205-228
5.1 Introduction	205
5.2 The Preparation Phase	207
5.3 The Development Phase	208
5.4 The Implementation Phase	209
5.4.1 The Sample of Pilot Study	210
5.4.2 Meeting and Discussions	211
5.4.3 Visiting and Observation	211
5.4.3a Observation Questionnaire of Pilot Study for Teachers and Pupils	212
5.4.3b Items and Scoring of Observation Questionnaire of Teachers and Pupils	212
5.4.3c Protocol of Implementing Observation Questionnaire of Teachers and Pupils	213
5.4.4 Implementing the Initial Instruments of Test and Tasks	214
5.5 The Assessment Phase	214

5.5.1 Validity and Reliability of Observation Questionnaire in the Pilot Study	215
5.5.2 Reliability between Forms A and B of Thinking and Emotion Tasks	216
5.5.3 Test-Retest of the Study Instruments	216
5.5.4 Validity and Reliability of the NBT and TS Strategies Tools	218
5.5.4a Panel Consensus in Neuroscience Principles	218
5.5.4b Panel Consensus in Educational Examples for Activities of Learning Environment	219
5.5.4c Matching between Thinking Skills of NBT, TS and Syllabus of Science Subject	221
5.5.4d Implication of Neuroscience Principles and Thinking Skills of NBT for each Lesson	222
5.6 The Results of the Pilot Study	224
5.6.1 Observation Questionnaire Result for Teachers and Pupils	224
5.6.2 Science Tasks of Thinking and Emotion Result	225
5.6.3 Creative Thinking Test Result	226
5.7 The Summary	228
CHAPTER SIX: Findings	229-273
6.1 Introduction	229
6.2 Descriptive Statistic	230
6.2.1 Respondents' Characteristics	230
6.2.2 Mean, Standard Deviation and Frequency	231
6.2.3 Normality among Groups in Pre and Post Tests	232

6.2.3a Test of Creative Thinking	232
6.2.3b Task of Thinking	234
6.2.3c Task of Emotion	236
6.3 The Equality of Quasi Experimental Study	238
6.3.1 Test of Groups' Equivalence and Homogeneity of Variables at the onset of the Study	238
6.3.2 Correlation between Pre-Test and Post-Test	240
6.4 Research Findings of Tests and Tasks	240
6.4.1 The Creative Thinking Tests	241
6.4.1a Groups Effect of Creative Thinking	242
6.4.1b Gender Differences in Creative Thinking	244
6.4.1c Interaction Effect of Creative Thinking	247
6.4.2 The Sub-skills of Creative Thinking Results	247
6.4.2a Groups Effect on Sub-skills of Creative Thinking	249
6.4.2b Genders Differences on Sub-skills of Creative Thinking	253
6.4.2c Interaction Effect on Sub-skills of Creative Thinking	258
6.4.3 Thinking Results of Science task	260
6.4.3a Groups Effect on Thinking of Science Task	260
6.4.3b Genders Difference on Thinking of Science Task	263
6.4.3c Interaction Effect on Thinking of Science Task	265
6.4.4 Emotion Performance Results of Science task	265
6.4.4a Groups Effect on Emotion of Science Task	266
6.4.4b Genders Difference on Emotion of Science Task	268
6.4.4c Interaction Effect on Emotion of Science Task	270
6.5 Summary	271

CHAPTER SEVEN: Discussions	274-307
7.1 Introduction	274
7.2 Discussions	275
7.2.1 Creative Thinking and Its Sub-Skills	276
7.2.1a The Main Effect of Creative Thinking (Overall Scores)	276
7.2.1b The Main Effects of Creative Thinking Sub-Skills	278
7.2.1c Genders Differences in Creative Thinking	283
7.2.1d Interaction Effect between the Kind of Strategy and Gender on Creative Thinking	284
7.2.2 The Performance in Science Tasks of Thinking and Emotion	286
7.2.2a The Main Effect of Performance of Thinking in Science Task	286
7.2.2b The Main Effect of Performance of Emotion in Science Task	289
7.2.2c Genders Differences in Thinking and Emotion of Science Task	292
7.2.2d Interaction Effect between Kind of Strategy and Gender on Thinking and Emotion of Science Task	294
7.3 Generalizations and Limitations of the Study	296
7.4 Suggestions and Recommendations	298
7.4.1 Recommendations for Implementation	298
7.4.1a Implications for Policy Makers	298
7.4.1b Implications for Teachers	300
7.4.2 Suggestions for Future Research	301

7.5 Conclusion	302
Bibliography	308
Appendixes	331

LIST OF TABLES

Content	Page
Table 3.1: Fluency List of Ideas	159
Table 3.2: Flexibility List of Ideas	160
Table 3.3: The Differences among NBT, TS and P	172
Table 4.1: Research Design and Variables	177
Table 4.2: Study Sample in Primary Schools at Penang Island	178
Table 4.3: The Descriptive Statistics of Study Groups in Academic Exam	181
Table 4.4: The Levene's Test of Equality of Error Variances for Academic Exam	182
Table 4.5: The One-way Analysis of Variance (ANOVA) Test of Academic Exam between Study Groups	182
Table 4.6: Coefficients of Correctors' Concordance by Kendall's (W) of TCT	195
Table 4.7: Coefficients of Internal Consistency by Cronbach Alpha of Instruments	197
Table 4.8: Research Questions and Data Analysis Method	200
Table 5.1: Diary of the Pilot Study at Bukit Gelugor Primary School	210
Table 5.2: Pilot Study Sample at Penang Island	210
Table 5.3: Pearson Correlations among Forms of the Test Science Tasks of Thinking and Emotion	216
Table 5.4: Pearson Correlations of Test-retest Reliability among Forms of the Science Tasks	217

Table 5.5: Pearson Correlations of Test-retest Reliability of the Creative Thinking Test	217
Table 5.6: Coefficients of Panels' Concordance by Kendall's (W) of Neuroscience Principles	219
Table 5.7: Coefficients of Panels' Concordance by Kendall's (W) of Educational Examples	220
Table 5.8: Coefficients of Panels' Concordance by Kendall's (W) of Matching between Thinking Skills	222
Table 5.9: Coefficients of Panels' Concordance by Kendall's (W) of Implication of Neuroscience Principles and Thinking Skills of NBT in Syllabus	223
Table 5.10: Background Information of Pupils in Pilot Study	224
Table 5.11: Mean Scores and Standard Deviation of the Two Types of the Tasks (Form A&B) as Perceived by the Pupils at Pilot Study	226
Table 5.12: The Difference between Pupils Who Wrote the Answer in English Language and Who Wrote in Bahasa Malaysia on Creative Thinking Test Result	227
Table 6.1: Background Information of the Students	230
Table 6.2: Mean, Standard Deviation and Frequency of the Variables (Pre and Post Test)	231
Table 6.3: The M-estimators of Creative Thinking for Study Groups	234
Table 6.4: The M-estimators of Thinking of Science Task for the Study Groups	236
Table 6.5: The M-estimators of Emotion of Science Task	238
Table 6.6: The Levene's Test of Equality of Error Variances in Pretest	239

Table 6.7: The One-way Analysis of Variance (ANOVA) Test at the Onset of the Study	239
Table 6.8: Pearson Correlations between Pre and Post Tests	240
Table 6.9: Mean, Standard Deviation of the Creative Thinking of the Post Test in each Group	241
Table 6.10: The ANCOVA Test of Difference between Students' Performance of Creative Thinking Test	243
Table 6.11: Post Hoc (LSD) Pairwise Comparisons of Creative Thinking between Groups	243
Table 6.12: Mean, Standard Deviation of the Creative Thinking of Male and Female in each Group (Post Test)	245
Table 6.13: The ANCOVA Test of Difference between Students' Genders on their Performance of Creative Thinking Test	246
Table 6.14: Post Hoc (LSD) Pairwise Comparisons Tests of Creative Thinking between Male and Female within NBT Group	247
Table 6.15: Pearson Correlations of between Sub-skills of Creative Thinking	248
Table 6.16: Mean, Standard Deviation of the Creative Thinking Sub-skills in each Group (Post Test)	249
Table 6.17: The Box's M and Levene's Test of Equality of Error Covariances of Sub-skills of Creative Thinking	250
Table 6.18: Multivariate Tests of Differences between the Sub-skills of Creative Thinking	250
Table 6.19: Results of Post Hoc (LSD) Pairwise Comparisons of Creative Thinking Sub-skills in Study Groups (Post Tests)	252

Table 6.20: Mean, Standard Deviation of the Creative Thinking Sub-skills of Male and Female in each Group	254
Table 6.21: The Box's M and Levene's Test of Equality of Error Covariances of Sub-skills of Thinking between Genders in NBT Group	255
Table 6.22: Multivariate Tests of Genders Differences in the Posttest of Sub-skills of Thinking for NBT Group	255
Table 6.23: The Box's M and Levene's Test of Equality of Error Covariances of Sub-skills of Thinking between Genders in TS Group	256
Table 6.24: Multivariate Tests of Genders Differences in the Posttest of Sub-skills of Thinking for TS Group	256
Table 6.25: the Box's M and Levene's Test of Equality of Error Covariances of Sub-skills of Thinking between Genders in P Group	257
Table 6.26: Multivariate Tests of Genders Differences in the Posttest of Sub-skills of Thinking for P Group	257
Table 6.27: Post Hoc (LSD) Pairwise Comparisons of Flexibility in Genders of P Group	258
Table 6.28: Mean, Standard Deviation of the Thinking of the Post Science Task in each Group	261
Table 6.29: The ANCOVA Test of Difference between Students in Groups of Study on their Performance of Thinking of Science Task	262
Table 6.30: Results of Post Hoc (LSD) Pairwise Comparisons in Post Science Task of Thinking in Groups	262

Table 6.31: Mean, Standard Deviation of the Thinking of the Post Science Task of Male and Female in each Group	263
Table 6.32: ANCOVA Test of Difference between Students' Genders on their Performance of Thinking of Science Task	264
Table 6.33: Mean, Standard Deviation of the Emotion of Science Post Task in each Group	266
Table 6.34: ANCOVA Test of Gender Difference on their Thinking in Performance of Science Task	267
Table 6.35: Results of Post Hoc (LSD) Pairwise Comparisons in Post Science Task of Thinking in each Group	267
Table 6.36: Mean, Standard Deviation of the Emotion of Science Post Task of Male and Female in each Group	268
Table 6.37: ANCOVA Test of Gender Difference on their Emotion in Performance of Science Task	270

LIST OF FIGURES

Content	Page
Figure 2.1: Human Brain	34
Figure 2.2: Lobes of Cerebral Hemisphere	36
Figure 2.3: A Neuron	38
Figure 2.4: The Neuron Transmission	39
Figure 2.5: Model of Creative and Critical Thinking	93
Figure 2.6: The Circumplex Model of Emotions	101
Figure 2.7: Framework of Deliberate and/or Spontaneous Modes of Processing, and Cognitive and/or Emotional Structures	103
Figure 2.8: Conceptual framework of the study	131
Figure 3.1: Neuroscience-Based Thinking (NBT) and Thinking Skills (TS)	146
Figure 3.2: Stages of Producing Idea in NBT and TS Strategies	147
Figure 3.3: Steps of Thinking Processing Stages of (NBT & TS) Strategies	148
Figure 3.4: Model of NBT that Interaction of Cognitive Neuroscience and Neuro Linguistic with Creative and Critical Thinking Skills	149
Figure 3.5: Framework of NBT and TS Strategies	150
Figure 4.1: Treatment of Study Groups	183
Figure 5.1: Phases of the Pilot Study	207
Figure 6.1: Normality of the Creative Thinking for each Group	233
Figure 6.2: Normality of the Thinking of science task for each Group	235
Figure 6.3: Normality of the Emotion of Science task for each Group	237
Figure 6.4 The Interaction between Groups and Thinking Task Fluency	259

GLOSSARY OF ABBREVIATIONS

NBT: Neuroscience-Based Thinking Strategy

TS: Thinking Skills Strategy

P: Prevalent Strategy

TCT: Test of Creative Thinking

STT: Science Task of Thinking

STE: Science Task of Emotion

Kesan Strategi Pemikiran Berdasarkan Neurosains (NBT) dan Kemahiran Berfikir (TS) terhadap Pemikiran dan Emosi dalam Kalangan Pelajar Sekolah Rendah

ABSTRAK

Matlamat kajian ini adalah untuk mengkaji kesan strategi Pemikiran Berasaskan Neurosains (*Neuroscience-Based Thinking, NBT*) dan Strategi Kemahiran Berfikir (*Thinking Skills, TS*) terhadap pemikiran kreatif dan prestasi tugas sains (pemikiran dan emosi) dalam kalangan pelajar sekolah rendah di Malaysia. Kajian ini menggunakan reka bentuk kajian kuasi-eksperimen dengan satu kumpulan kawalan dan dua kumpulan eksperimen. Sampel terdiri daripada 98 orang murid pelajar darjah lima bagi tahun pengambilan 2010. Kedua-dua kumpulan eksperimen dikenali sebagai NBT dan TS, manakala strategi pervalens (P) sebagai kumpulan kawalan. Pengajaran dikendalikan oleh tiga orang guru sains yang berbeza. Ketiga-tiga kumpulan menjalani dua penilaian (praujian dan pascaujian) bagi tiga instrumen berikut: Ujian Pemikiran Kreatif (*Test of Creative Thinking, TCT*), Tugas Pemikiran Sains (*Science Task of Thinking, STT*) dan Tugas Pemikiran Emosi (*Science Task of Emotion, STE*). Kebolehpercayaan instrumen adalah baik sebagaimana yang ditunjukkan oleh Cronbach Alpha dan korelasi Pearson. Statistik inferensi ANCOVA dua hala dan ujian MANCOVA, serta kaedah LSD post hoc digunakan pada tahap $p < .05$ untuk menentukan secara statistik perbezaan yang signifikan di antara kumpulan kajian. Dapatan kajian menunjukkan bahawa terdapat perbezaan yang signifikan di antara kumpulan. Dapatan ujian pemikiran kreatif dalam sains dan subkemahirannya (kefasihan, kefleksibelan dan keaslian) menunjukkan bahawa murid-murid dalam kumpulan NBT mendapat skor yang lebih tinggi berbanding dengan kumpulan TS dan P dalam semua aspek kecuali dalam subkemahiran (kefasihan) yang mana kumpulan TS memperoleh skor yang lebih baik. Selanjutnya, keputusan menunjukkan bahawa tiada perbezaan yang signifikan dalam pascaujian di antara gender dalam semua kumpulan. Begitu juga, tiada kesan interaksi yang signifikan dalam pascaujian di antara semua kumpulan dan kedua-dua gender terhadap semua pemboleh ubah. Justeru, kajian ini mencadangkan agar pendidik berusaha meningkatkan pembelajaran dan kreativiti dalam kalangan pelajar dengan menerapkan prinsip neurosains dalam proses pembelajaran dan pengajaran, Hal ini boleh dilakukan dengan menyepadukannya ke dalam kurikulum.

**Effects of Neuroscience-Based Thinking (NBT) and Thinking Skills (TS)
Strategies on Thinking and Emotion among Primary Schools pupils**

ABSTRACT

The aim of this study is to investigate the effects of Neuroscience-Based Thinking (NBT) strategy and Thinking Skills (TS) strategy on creative thinking and the performance of science tasks (thinking and emotion) among Malaysian pupils in primary schools. This study used quasi-experimental research design with one control group and two experimental groups. Ninety eight pupils enrolled in standard five during the 2010 educational year formed the sample. The two experimental groups were named NBT and TS while prevalent strategy (P) as the control group. The instruction was carried out by three different science teachers. These three groups were measured twice (pretest and posttest) of three different instruments: the Test of Creative Thinking (TCT), Science Task of Thinking (STT) and of Emotion (STE). The instruments' reliabilities are good as showed by Cronbach alpha and Pearson correlation. Inferential statistics, namely two ways ANCOVA and MANCOVA tests, and LSD post hoc method were used at α .05 level to determine statistically significant differences between study groups. The results showed that there were significant differences between groups. The result of the test of creative thinking in science and its sub-skills (fluency, flexibility and originality) indicated that the pupils in NBT group scored higher as compared to TS and P groups in all but one sub-skill (fluency) where TS group has better score. Likewise, the TS pupils are higher than P pupils except in originality where both were similar. Similarly, the results of thinking and emotion of science tasks revealed that the pupils of NBT scored higher than TS and P groups in their thinking and emotion. Furthermore, the results revealed that there were no significant differences in posttest between gender in all groups. Similarly, there were no significant in interaction effects in post-test between all groups and both gender on all variables yet the female pupils of TS group have high scores in fluency. Therefore, the study recommends that educators should work to enhance learning and creativity among pupils by employing neuroscience principles in teaching and learning process by integrating them into curriculum.