

The Effects of Circadian Typology, Emotional Intelligence and Creativity on the Academic Achievement of Secondary School Students in Delta State, Nigeria

Agokei, R. C.

*Department of Guidance and Counselling
School of Education
Adeyemi College of Education, Ondo, Nigeria
E-mail: agokeialexander@yahoo.com*

Abstract

The study investigated the effects of Circadian Typology, Emotional Intelligence and Creativity on the achievement of 300 Senior Secondary School III Students in Asaba, Delta State, Nigeria. The participants responded to three valid scales. A correspondence of the participants academic achievement was retrieved from their schools. Using Pearson Product Correlation and Multiple Regression procedures to investigate the predictive capacity of the independent variables on the dependent variables, the result indicated that the three independent variables, when taken together were effective in predicting academic achievement. However while circadian typology had no significant contributive effect, other variables contributed significantly to achievement. It was recommended that emotional intelligence and creativity should be fostered and encouraged among students in accordance of enhancing students positivity in the academic.

Keywords: *Circadian typology, Emotional Intelligence, Creativity, Academic Achievement.*

INTRODUCTION

That education is an “instrument par excellence” for effective and efficient national development has no skepticism associated with it and thus cannot be overemphasized. Notably, it is often said to be the panacea for developing intellectual abilities, enculturization and shaping cultural attributes, acquiring knowledge and skills as well as a favourite tool to move a nation towards developing scientific and technological culture. The realization of this fact has necessitated participation by the government, non-governmental agencies, communities and private stakeholders in Education. Hence, it is no wonder that the philosophy of Education in Nigeria is based on “equal educational opportunities and egalitarianism; a land full of bright opportunities for all citizens (National Policy on Education, 1998). The term academic achievement has been described as the scholastic outcome of a student at a given moment (Huitt, 2003). This refers to what and from how an individual is able to demonstrate his or her intellectual abilities. This scholastic outcome could be explained as the standard attained in a course or groups of course taken (Owoyemi, 2000). Academic achievement, which is the central focus that distinguish the quality and standard of education has enjoyed numerous theoretical and empirical concern from scholars. To this, Adeyemo (2001) noted that, this is because the major goal of the school is to work towards attainment of academic excellence by the students. He further asserts that

although, there may be other peripheral objectives, emphasis is always placed on the achievement of sound scholarship. Achievement, being a yardstick for evaluating educational standard and development is therefore the major factor for the inexhaustive and continual studies it has enjoyed from researchers globally. While noting that learners transform what it is they are expected to learn often in some rather unexpected ways, Halpern (2004) argues that those interested in the quality of learning are naturally interested in the scholastic outcomes of learning. The implication is that where the quality of learning is being judged, the evidence is provided in the assessment of the eventual outcome of the learning.

According to Aremu, Tell and Tella (2007), the attempt by most education psychologist to investigate what determines academic outcomes of learner they have come up with more questions than answers. Corroborating this, with the regard to learning outcomes Okoro (2005), opined that whereas emphasis has continually been laid on how learners are taught, much less emphasis has been laid on how learners learn. The fact is that even though some factors that affect an individual's learning are resident in the environment of the learner (teacher, classroom, peers, textbook and so on), some other factors resident in the learner himself also affect his learning. That is to say that learning also depends on the psycho-physiological make up of the individual as well as learning conditions. The utmost importance of this, has led some Educational psychologist to emphasis particularly the need to mount researches on effect of some of these psychological and physiological factors of the learners that affect their academic achievement such as self-concept, external and internal locus of control, and as well as self-efficacy amongst many others (Gonzalez et al., 2000; Akubuiro and Joshua, 2004; Agokei, 2005, Odinko and Adeyemo, 1999; Emeke and Yoloye, 2000).

Unfortunately, poor academic performance pervades with the numerous implications and the enormity of its effect on the students, the family, the school, the society and the nation (Amanzu, 2000; Aremu, 2000; Aremu and Falaye, 2001). Till recent times blames have been apportioned particularly to educational stakeholders with regards to whom and what is responsible for poor academic achievement. Amidst these, how psychological factors as circadian typology, emotional intelligence and creativity could influence achievement of students has received disheartening focus. The knowledge of the constructs and content of these variables could serve as intervention to students' poor achievement in schools. For instance, researchers investigating the effects of circadian typology normally refer to individuals who have their peak or optimal performance time during the early morning hours as morningness types; conversely the eveningness type refers to individuals who experience their optimal performance in the evening hours. Although, research has demonstrated the effects of circadian rhythm on individual performance and abilities, to date there have been only a small number of studies on students morningness-eveningness preference (Goldstein, Hahn, Hasher, Wiprzyck and Zelazo, 2006; Natale, Alzani and Cicogna, 2003; Natale and Lorenzetti, 1997) and poorer academic achievement (Kim, Duecker, Hasher and Goldstein, 2002). In Natale and Lorenzetti's, (1997) study, findings indicate that morning types have better immediate recall in the morning, whereas evening types perform better in the evening (Natale and Lorenzetti, 1997), Goldstein et al. (2006),

shed more light to this when he found that adolescents tested at their non-optimal times of day and adolescents who are evening-types tested at morning terms appear to be a risk for poor academic performance and evening-types appear to be at risk for behavioural adjustment problems. Of potential great practical importance is the report of a synchrony effect: individual adults cognitive functioning (such as memory and attention) is at its peak at their preferred or optimal time of day and falls off substantially at their non-optimal times (May & Hasher, 1998; Yoon, May and Hasher, 1999). Hitherto, an individual's intelligence and mental capacity is said to have accounted only for successful achievement. Recent studies have shown that a large proportion of success is actually predicted by emotional intelligence. Hence, this forms the basis of research on emotional intelligence and academic achievement of students in the classroom.

With regards to Huy (1999), that emotional intelligence is domain specific, Petrides (2004) argued that any investigation of the potential effects of emotional intelligence on academic performance must be pursued in a specific context. Early discussions on the relationship between emotional intelligence and achievement in various educational contexts claimed a strong association between the two variables (Abisamara, 2000; Mathews and Zeidner, 2000; Mathews, Roberts and Zeidner, 2003; Ishola, 2005; Adewoye, 2005; Adeniji, 2004; Aremu, et. al., 2007). Further, Adeyemo (2004) in a study of the buffering effect of emotional intelligence on the adjustment of transition students in secondary schools found that emotional intelligence is a significant phenomenon for adequate adjustment of students. He further noted that the significant effect of the study is for development of school-based counselling interventions targeting students' effective overall academic activities and achievement. That the same may apply to participants in this study is however, not known. This is because little is known about how emotional intelligence predisposes to success in academic achievement, hence the necessity for this study.

Another concept that may influence academic achievement is creativity. Accruing from within the individual and transcending the individual's capacity, creativity appears to be characterized as a paradoxically complex phenomena to conceptualize. Akinboye (2002) describes it as the generating of new ideas, restructuring of new ideas from old as well as escape from old ideas concepts and perceptions. The Bakareian cognitive psychological approach proposed a hierarchical organization of cognitive process and development where creativity is the apex of cognition. This theory gives credence to the conception that creativity affects achievement continuously and thus certainly aids success in particularly the academia.

Many research studies in the past decades suggest similar findings of strong correlation between creativity and achievement as well as significant difference in achievement between high and low creative persons. However, in recent times a paucity of such studies are readily available. Most of these studies indicate the positive predictive ability of creativity in academic achievement (Ananda, 2005; Adewoye, 2005; Kraft, 2005). However, according to some discrepant studies (Behroozi, 1997 and Nori, 2002) showed that creativity was not related to academic achievement in any significant way. Nevertheless, Ai (1999) refers to others who investigated this matter and deduced that creativity was actually correlated with advanced levels of academic achievement. This

becomes obvious when Osunde (1998) following similar findings decried the down playing of creativity in our schools and prayed its advancement in education of students in our schools. It is thus against this backdrop that this study seeks to determine the effects of these variables on achievement of students in Delta State, Nigeria. The following research questions were formulated to guide the study:

1. Is there any significant combined effects of circadian typology, creativity and emotional intelligence on the academic achievements of students.
2. Is there any significant contributing effect of circadian typology, creativity and emotional intelligence on the academic achievements of students.

PARTICIPANTS AND PROCEDURE

The researcher adopts the ex-post facto design. This was to ensure the study is devoid of manipulation of the variables in concern. The population of this study comprised all Senior Secondary School III students in Asaba Delta State Nigeria. Simple random sampling was used to select 300 students (30 each from 10 randomly selected schools). The sample comprised of 124 females and 173 males with age range of 15-21. An instrument comprising of three valid and reliable scales was utilized for the study.

The instrument used for the measurement is the modernized version of Morningness-Eveningness Scale (Horne and Osterberg, 1976) an evaluative instrument to identify one's typology. The determination of an individual's circadian typology is based on a seven (7) item scale ranging from six to thirty-two, where the low scores indicate a greater degree of eveningness and higher scores indicate a greater degree of morningness (Natale and Lorenzetti, 1997). The scale's convergent validity is adequate at $r = 0.79$.

The Emotional Intelligence Scale (EIS) contains items on emotional intelligence developed by Schutte, et al. (1998) a thirty-three (33) item scale structured in a 5 Likert format to elicit standard measure of individual of emotional intelligence. The EIS has demonstrated high internal consistency with Cronbach's α ranging from 0.87 to 0.90 and to two-week test-retest reliability coefficient of 0.78 (Schutte et al. 1998).

Ibadan Creativity Assessment Scale (ICAS) was also used. The instrument is the 88 item Ibadan creativity assessment scale structures in 5 scale Likert format (1 = very much unlike me, 2 = unlike me, 3 = not decided, 4 = like me, 5 = very much like me). The scale has four sub-sections; Ideative flexibility (21 items), Ideative originality (25 items), Ideative fluency (25) and creative motivation (27 items). The test was developed and validated following the internal mechanism of psychometric strategies. The internal mechanism utilized include the establishment of coefficient Alpha, factor analysis plus the computation of discriminant convergent construct validities. The scale reported a test-retest reliability of 0.76. For ratings in achievement of the participants, achievement scores from their previous term examination was retrieved for us. This cut across ten (10) subjects which includes, Mathematics, English, Biology, Agricultural Science, Economics, Chemistry, Physics, Geography, Literature in English and History.

The researcher personally distributed and collected the completed questionnaire from the students. Permissions were obtained from the principals of the sampled schools after which the researchers with other research assistants administered the questionnaire on the participants. The consent of all the participants were also sought before administration. Maximum return was ensured. Relationship between the independent variables (Circadian typology, emotional intelligence and creativity) and the independent variable was ascertained using corresponding scores obtained from the variables and tested through Pearson Product Moment Correlation Coefficient Statistics. Similarly, data on the predictive ability of the independent variable on the dependent variable was analysed using multiple regression statistics. All analyses were carried out at 0.05 margin of error.

RESULTS AND DISCUSSION

Table 1 shows that the correlation coefficient between all the variables are positively significant. Notably are the Emotional intelligence and creativity with high correlation coefficient .783 and circadian typology and achievement with least correlation .401 amongst all others. Sequel to the result presented in table 2, the three independent variables (circadian typology, emotional intelligence and creativity) when combined as a composite construct yielded a coefficient multiple (R) 0.594 and a multiple readjusted. This shows that 35% of the total variance of achievement of the participants is accounted for by the combination of the three variables. The analysis of variance of the multiple regression data produced a ratio (value significant at 0.05 level ($r = 53.924$; $R < 0.05$). Thus, the findings confirm that circadian typology, emotional intelligence and creativity are positive significant predictors of achievement, hence should be a focus for further research.

Accruing from the result displayed in table 3 above, the two variables emotional intelligence and creativity made significant contributions to the prediction of achievement. Emotional intelligence had a greater effect ($\beta = .345$, $t = 1.333$; $P < 0.05$) than creativity ($\beta = .231$, $t = 3.030$; $P < 0.05$). However, the predictive potential of circadian typology was not significant ($\beta = 0.077$, $t = 1.333$ $P < 0.05$).

The correlation matrix on table 1 indicates that there is positive and significant relationship amongst the variables, suggesting possible predictive abilities of the independent variables on achievement of the participants. With regards to Emotional Intelligence the findings is in consistency with Aremu et. al., (2007) which establish that emotional intelligence has a strong and positive correlation with achievement. Osunde (1998) who also showed in his study that creativity is positively related to achievement, thus providing a base for this present finding with regards to creativity and achievement. The multiple regression analysis in table (2) revealed that circadian typology, emotional intelligence and creativity collectively as a composite factor can significantly and positively predict achievement of the participants. The table shows a multiple regression coefficient of .594 and a regression square of .353 indicating that 35% of variance determining achievement is accounted for by the combination of circadian typology, emotional intelligence and creativity of the participants.

As for the extent to which each of the three independent variable contributed to the prediction, it could be inferred from table (3) that emotional intelligence is a better predictor of achievement. This findings finds consistency with prior studies (Adewoye, 2005; Adeniji, 2004; Aremu, et. al., 2007). It also corroborates the buffering study of Adeyemo (2004) who identified that emotional intelligence is a key factor in determining achievement and test performance in designated task. Cognitive functioning and emotional ambience has been found to correlate. Hence, it is believed that having the capacity to govern ones emotion an others could be a functional tool for designated scholastic task. This might explain for the capacity of emotional intelligence to determines academic achievement among secondary school students.

In the investigation, it was also found that creativity predicted academic achievement. This finding corroborates that of Osunde (1998), Kraft (2005), and Adewoye (2005). It also finds consistency with Ananda (2005) who attested to the fact that creativity could be a factor responsible for surplus in achievement. Creativity describes conscious cognitive processes stimulated by problematic situation, guided by interest and resulting in the generation of statistically infrequent unique, valuable and appropriate ideas, useful in turning challenges of life into fruitful, beneficial and profitable outcomes. It is a mental process targeting problem solving. Therefore, in accordance with literature this findings has shown that creativity is a relevant factor for students achievement.

Circadian typology on the other hand did not show significance with achievement as table (3) has shown. Although literature reveals some significance in variations of the concept in achievement as supported by Goldstein et al. (2006), Natale & Lorenzetti (1997) and Natale, Alzani and Cicogna (2003), this present finding shows that achievements could be accounted for by other variables than circadian typology. It is also noteworthy that the findings does not entirely conflicts with the significant findings of Song and Stough (2000) and May & Hasher (1998) Synchrony effects studies which concluded that not all processes are equally susceptible to synchrony effects, as retrieval of well-learned responses seems to be preserved over the day. They insist that instead it is the blocking of such responses when they are inappropriate or no longer relevant that seems to be disproportionate and disrupted at non-optimal times. In the light of this fact that other factors could be responsible for present finding, it therefore necessary that further studies be conducted with the necessary control required to determine the strength of this finding in concurrence with literature.

Table 1: Descriptive Statistics and Correlation among the Variables

Variables	Mean	Standard Deviation	1	2	3	4
Achievement	65.13	13.211	1.000			
Circadian Typology	23.45	4.907	.401	1.000		
Emotional Intelligence	106.78	17.338	.543	.538	1.000	
Creativity	225.42	35.584	.571	.576	.783	1.000

Table 2: Summary of Multiple Regression Analysis between Predictor Variables and Achievement.

R	=	0.594			
R ²	=	0.353			
Adj R ²	=	0.347			
Std Error Estimate	=	10.677			
Source of Variation	df	Sum of squares	Means Square	f-ratio	P
Regression	3	18440.24	6416.747	53.924	.05
Residual	296	333740.95	113.990		
Total	299	52181.19			

Table 3: Contribution of the Independent Variables to the Prediction of Achievement

Predictor	Unstandardised Coefficient		Standardized Coefficients	t-ratio	Sig.	P
	B	SEB	Beta (β)			
Circadian Typology	.208	.156	.077	1.333	.184	
Emotional Intelligence	.176	.058	.231	3.030	.003	< 0.05
Creativity	.128	.029	.345	4.396	.000	

CONCLUSIONS AND RECOMMENDATIONS

While the findings seem most relevant for students the implications for educational advancement in continuing and non-formal education as well as significant others are as well important. For instance, it is evident considering the Circadian typology phenomena that extreme morning or evening class times should be avoided to prevent complications, sympathy and prejudice in achievement among students. Furthermore, it is also important that emotional intelligence and creativity should be fostered and encouraged among students in accordance of enhancing students positivity in the academia. Hence, testing and developing student training programmes based on emotional intelligence and creativity, targeting academic success should be promoted. Restructuring the school curriculum to accommodate emotional intelligence and creativity may also be vital to student success in academic achievement.

REFERENCES

- AbiSamara, N.** (2000). The Relationship between Emotional Intelligent and Academic Achievement in Eleventh Graders. *Research in Education*, FED. 661
- Adeniyi, E. A.** (2004). *Emotional Intelligence, Self-efficacy and Motivation as Correlates of Scholastic Performance Among School Adolescents in Ibadan Metropolis*. An Unpublished B.Ed Project, Department of Guidance and Counselling, Faculty of Education, University of Ibadan.
- Adewoye, N.** (2005). *The Influence of Emotional Intelligence and Creativity on the Academic Achievement of Secondary School Students*. An Unpublished B. Ed Project, Department of Guidance and Counselling, Faculty of Education, University of Ibadan.

- Adeyemo, D. A.** (2001). Teacher Job Satisfaction, Job Involvement Career and Organizational Commitment as Correlates of Student Academic Performance. *Nigerian Journal of Applied Psychology* 6 (2), 126-135.
- Adeyemo, D. A.** (2004). Buffering Effect of Emotional Adjustment of Secondary School Students in Transition. *Electronic Journal of Research in Educational Psychology* 3 (2), 79-90.
- Agokei, R. C.** (2005). *The Influence of Self-Concept on the Academic Performance of Secondary School Students in Oshimilli North Local Government Area of Delta State*. Unpublished B.Ed. Project Delta State University.
- Ai, X.** (1999). Creativity and Academic Achievement: An Investigation of Gender Differences. *Creativity Research Journal*, 12(4), 329-337.
- Akinboye, J. O.** (2002). *Psychological Principles and Success in Life and the Work Place*. Ibadan, Stirling Horden.
- Akubuiro, I. M. and Joshua, M. T.** (2004). Self Concept, Attitude and Achievement of Secondary School Students in Science in Southern Cross River State, Nigeria. *The African Symposium* 4 (1)
- Amanzu, N. E.** (2000). *Impact of Five Independent Variables on Academic Performance of Senior Secondary School Students in Mainland Local government of Lagos State*. An Unpublished Bachelor of Education Project. Department of Guidance and Counselling, University of Ibadan, Ibadan.
- Ananda, K. P.** (2005). *Academic Achievement of Groups formed Based on Creativity and Intelligence*.
- Aremu, A. O.** (2000). Impact of Home, School and Government on Primary School Pupils Academic Performance. *The Exceptional Child* 5, (1), 106-110.
- Aremu O. A., Tell A. and Tella A.** (2007). Relationship among Emotional Intelligence, Parental Involvement and Academic Achievement of Secondary School Students in Ibadan, Nigeria. *Essays in Education*, 18, 1-14.
- Aremu, S. and Falaye, J.** (2001). Individual Family, School, Society and Government; A Multiple Regression Analysis of a Nigerian University Undergraduates' Scholastic Achievement. *Education Research*.
- Behroozi, N.** (1997). *The Relationship between Personality, Creativity and Academic Achievement among Undergraduate Students*. University of Ahvaz, Ahvaz, Iran.
- Emeka, E. A. and Yoloye, T. W.** (2000). An Investigation into the Effect of Locus of Control of the Adjustment of Foreign Students at University of Ibadan, Nigeria. *African Journal of Cross-Cultural Psychology and Sport Facilitation* 2, 31-35.
- Federal Government of Nigeria** (2004) National Policy on Education. Lagos: NERDC.
- Goldstein, D., Hahn, S. C., Hasher, L. Wiprzycka and Zelazo, D. P.** (2006). Time of Day Intellectual Performance and Behavioural Problems in Morning Versus Evening Type Adolescents: Is there any Synchrony Effects. *Personality and Individual Difference* 42 (3) 431-440.
- Gonzalez-Pianda, J. A., Nunez, J. C., Gonzalez-Punariaga, S. Alvarez, L.; Rocas, C., Garcia, M. Gonzalez, P. Cabanach, R. and G. Valle** (2000). Self Concept; Causal Attribution Process and Academic Goals in Children with and Without Learning Disabilities. *Psicothema*, 12 (4), 548-556.
- Halpern, O. F.** (2004). *Using the Principles of Cognitive Science and Learning Theories to Enhance Learning and Teaching. What Works: A Project Kaleidoscope Essay, Volume IV.* (On-line) <http://www/pkal.org/template2.cfm?c-id=99>
- Horne, J. and Ostberg, O.** (1976). Morning and Evening Questionnaire in Megilinas, K. (Eds) *The Influence of Time of Day Preference on Body Image and Mood in College-Aged Women. Saint Anslem College Department of Psychology Senior thesis*. Retrieved from <http://www.anslem.edu/internet/psych/thesis/2005/migilinas/webpage.html>

- Huitt, N.** (2003). *The Information Processing Approach to Cognition*. Education Psychology Interactive. Voldosta, G.A.: Voldosta State University.
- Huy, Q. N.** (1999). Emotional Capability, Emotional Intelligence, and Radical Change. *Academy of Management Review*, 24, 325-345.
- Ishola, A. M.** (2005). *The Influence of Cognitive Styles, Study Habits Emotional Intelligence, Evaluation Technique and Psychosocial Factors on Students Academic Performance*. An Unpublished M.Ed Dissertation Department of Guidance and Counselling, Faculty of Education, University of Ibadan.
- Kim, S., Dueker, G.L., Hasher, L. and Goldstein, D.** (2002). Children's time of day preference: Age, gender, and ethnic differences. *Personality and Individual Differences*, 33, 1083-1090.
- Kraft, U.** (2005). "Unleashing Creativity." *Scientific American Mind*. April: 16-23.
- Matthews G., Zeidner M. and Roberts R. D.** (2003) *Emotional Intelligence: Science and Myth*. Cambridge, MA: MIT Press.
- Mathews, G., and Zeidner, M.** (2000). *Emotional Intelligence, Adaptation to Stressful Encounters, and Health Outcomes*. In Bar-On, R., J.D.A. Parker (eds.). *The Handbook of Emotional Intelligence* (pp. 459-489). Jossey-Bass, San Francisco.
- May, C. P. and Hasher, L.** (1998). Synchrony Effects in Inhibitory Control over Thought and Action. *Journal of Experimental Psychology: Human Perception and Performance*, 24 (2), 363-379.
- Natale, V. and Lorenzetti, R.** (1997). Influences and Morningness-Eveningness and Time of Day on Narrative Comprehension. *Personality and Individual Differences* 23, 685-690.
- Natale, V., Alazani, A. and Cicogna, P.** (2003). Cognitive Efficiency and Circadian Typologies: A Diurnal Study, *Personality and Individual Differences*, 35, 1089-1105.
- Nori, Z.** (2002). *Gender differences creativity, academic achievement (mathematics, sciences and language of literature) among high school in City of Shiraz, Iran*. University of Shiraz, Shiraz.
- Odinko, M. N. and Adeyemo, D. A.** (1999). Students' Socio-psychological Factors as Predictors of Achievement in Senior Secondary School English Language. *African Journal of Educational Research Vol. 5, No. 1*.
- Okoro, C. C.** (2005). Study Habits and Academic Performance of Junior Secondary Students in Uyo Metropolitan Schools. *DELSU Journal of Educational Research and Development* 4 (1), 136-145.
- Osunde, A. U.** (1998). Creativity and Intelligence as Correlates of Academic Achievement of Senior Secondary School Students: *African Journal of Education* 3 (1) 85-94.
- Owoyemi, N.** (2000). *Moderation and Starling of continuous and assessment scores in junior Secondary School Certificate Examination and primary School leaving certificates assessment*. Paper presented at a Senior Staff Seminar Ministry of Education Ado Ekiti 2nd March, 2-9.
- Petrides, L.** (2004). *Turning Knowledge Into Action: What's Data Got to Do With It?*, League for Innovation in the Community College.
- Schuttle, N. S. Malouff, J. M. Hall, L. E. Haggerty, D. J., Cooper, J. T. Golden, C. J. and Jornheim L.** (1998). Development and Validation of a measure of Emotional Intelligence. *Personality and Individual Differences*. 25, 167-177.
- Song, J. and Stough, C.** (2000). The relationship between morningness-eveningness, time-of-day, speed of information processing and intelligence. *Personality and Individual Differences*, 29, 1179-1190.
- Yoon C., May C. P. and Hasher L.** (1999). Aging, circadian arousal patterns, and cognition. In: Schwarz N, Park D, Knauper B, Sudman S, editors. *Cognition, aging, and self-reports*. Psychology Press; Philadelphia: 117-143