Journal Homepage: - www.journalijar.com
INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)
Article DOI: 10.21474/IJAR01/2137
DOI URL: http://dx.doi.org/10.21474/IJAR01/2137
ISSN NO. 2320-5407

RESEARCH ARTICLE

THE ROLE OF METACOGNITIVE AWARENESS OF READING STRATEGIES AS A PREDICTOR OF ACADEMIC ACHIEVEMENT.

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Manuscript Info

Manuscript History

Received: 25 September 2016
Final Accepted: 27 October 2016
Published: November 2016

Key words:-
Academic outcome, Global reading strategies, MARSI, Problem solving strategies, Support reading strategies.

Abstract

Background and objectives: Medicine being a very intensive course requires the learners to be constantly focused and ready to imbibe information. To stay up to date with the rapidly evolving world of medicine, it is imperative that learners become skilled readers and thereby good performers academically.

Material and methods: 86 first year medical students were asked to fill the Metacognitive Awareness of Reading Strategies Inventory (MARSI) questionnaire and the findings were compared with their academic scores and results analyzed.

Results: Metacognitive awareness of reading strategies may be considered as an indicator of academic performance. On analysis of the subscales, support reading strategies has highly significant positive correlation while global reading strategies with overall strategies have a significant positive correlation with academic performance. Problem solving strategies have no significant role to play.

Conclusion: Incorporation of reading strategies as an actively interventional tool in the medical curriculum will ensure academic success. Development of strategies foster independent learning and transfers responsibility for monitoring learning from the teachers to students themselves as the medical profession demands one to be lifelong learners.

Introduction:-

'Doctor', the word derived from 'doktor' (Latin), means 'teacher'. But doctors in addition to being teachers are lifelong learners (Dorland's Illustrated Medical Dictionary, 2008). A doctor must cope and stay abreast of the latest innovations which are a constant in the medical field. The vision of the regulatory body for medicine, the medical council of India (MCI), is to produce competent medical graduates. Competence is assessed on the basis of skill, knowledge and attitude acquired during the intensive training period (Maria Ruzafa-Martinez, Lidon Lopez-Iborra et al, 2013). However, MCI does not follow the module based system of medical education widely used in the west. Instead, the curriculum designed by the MCI is semester based with a few broad specialities covered in each

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semester. In the first year of medical study, three major specialities namely Anatomy, Physiology and Biochemistry are included. Needless to say, that the curriculum is vast and the time is short. The academic pressure and peer pressure further adds stress to the already burdened medical student.

Students in general adopt different styles of reading. However, the adoption of these styles has been subconscious and they have had no formal training in various reading strategies. Recent trends within the domain of reading and learning strategies have emphasized the role of metacognitive awareness while learning (Alexander PA and Jetton TL , 2000) (Gurthrie J and Wigfield A ,1999) (Pressley M , 2000) (Pressley M and Afflerbach P, 1995). Awareness of one's own thinking and short comings enables one to utilize various strategies for comprehending textual information (Banner A and Ye W, 2011). Recent research has explored the role of reading strategies in academic performance in school children (Hossein Mousavi S, Saeed Mousavi et al, 2015). Professional education requires the learners to actively adopt newer strategies which will initiate effective academic outcome.

Academic outcome is a source of concern for all educational stake holders in the education sector. The career path of a student depends on his academic success and so does his quality of life. The inconsistencies of reading strategies with academic outcome led us to explore the prevalent use of reading strategies in our students and to evaluate the effect of these strategies on their academic outcome. Reading strategies are broadly classified into cognitive strategies, metacognitive strategies and resource management strategies (Jie Li and Cecilia Ka-wai Chun, 2012) (Freiedrich HF,1995). That the cognitive strategies have a positive correlation on academic outcome has already been well established, while the role of metacognitive strategies remains inconclusive. Against this backdrop, we decided to explore the role of metacognitive awareness of reading strategies on the academic outcome of our medical students.

Material and methods:-

This cross sectional study was done to evaluate the metacognitive awareness of reading strategies among the first year medical students studying in Jubilee Mission Medical College, Kerala, India. The institutional ethics clearance and students consent was obtained. Out of the 100 first year students, 86 participated in the study. Metacognitive Awareness of Reading Strategies Inventory (MARSI) questionnaire was administered to them during college hours. The purpose of the inventory was explained to them and it took approximately 20 minutes for the students to fill the questionnaire.

MARSI questionnaire:-

Awareness of reading strategies in our study group was analyzed using the metacognitive awareness of reading inventory questionnaire (MARSI) which is a validated tool comprising of 30 questions on a 5 point Likert scale ranging from 1 (I never do this) to 5 (I always do this). The highest score obtainable is 150. The questionnaire also assesses the awareness in the following subscales; global strategies, problem solving strategies and support reading strategies (Kouider Mokhtar and Carla A Reichard, 2002).

Global reading strategies:-

These strategies are oriented towards a global analysis of the text and they can be thought of as generalized and intentional reading strategies. In other words, it sets the stage for the reading act. 13 items are included in this subscale and the maximum score attainable is 65(Kouider Mokhtar and Carla A Reichard, 2002).

Problem solving strategies:-

These help to navigate through the text skillfully. They are repair strategies to be used when problems arise while trying to comprehend textual information. The maximum score is 40 and 8 items are included here (Kouider Mokhtar and Carla A Reichard, 2002).

Support reading strategies:-

Involves the use of reference material to aid in the learning process. The aim of the support mechanism is to sustain responsiveness to reading. 9 questions are included in this subscale with 45 as the highest score (Kouider Mokhtar and Carla A Reichard, 2002).

Overall reading strategies:-

The constant interplay of these 3 strategies forms the overall strategy used by the reader and influences his comprehension ability.

The overall average and the mean for each subscale were calculated. Based on this, the reading awareness of the students was classified as low (<2.5), medium (2.5-3.5) and high (>3.5). This inventory serves as a catalogue of all the strategies used by the student while reading academic material.

Academic scores:-

Our participants comprise of 86 medical students who study the subjects Anatomy, Physiology and Biochemistry in the first year of MBBS. The overall performance of the students throughout the year was tabulated and analyzed. The average scores for each subject were computed and the overall average of each student was obtained. Based on this, the study group was classified into very good (>75%), good (65-75%), average (50-65%) and poor scorers (<50%). The overall class average was also calculated.

Results:-

86 students participated in the study of which 57% were girls. The data obtained from the inventory was tabulated along with the scores obtained and means for all the subscales, the overall average, and the average of the scores obtained was also calculated. ANOVA, Pearson's correlation test and regression analysis by Tukey's method was done on the obtained data.

Table 1:- Classification of students based on their academic scores

Scores	Overall frequency	Overall percentage
Very good (>75%)	7	8
Good (65-75%)	32	37
Average (50-65%)	43	50
Poor (<50%)	4	5

Table 2:- Comparison of the academic scores with reading strategies

Academic scores		G- MEAN	P- MEAN	S- MEAN	O-MEAN
Very Good	N	7.00	7.00	7.00	7.00
	Mean	3.73	4.33	3.78	3.91
	Std. Deviation	0.34	0.49	0.34	0.26
Good	N	32.00	32.00	32.00	32.00
	Mean	3.41	3.68	3.41	3.49
	Std. Deviation	0.56	0.73	0.59	0.53
Average	N	43.00	43.00	43.00	43.00
	Mean	3.21	3.68	3.21	3.35
	Std. Deviation	0.60	0.65	0.53	0.449
Poor	N	4.00	4.00	4.00	4.00
	Mean	2.94	3.62	2.91	3.11
	Std. Deviation	0.65	0.47	0.96	0.65

G – global reading strategies; P- problem solving strategies; S- support reading strategies; O-overall strategies

Table 3:- Gender wise comparison of the academic scores with reading strategies

Gender	Academic scores		G- MEAN	P- MEAN	S- MEAN	O- MEAN
F	Very Good	N	7.00	7.00	7.00	7.00
		Mean	3.73	4.33	3.78	3.91
		Std. Deviation	0.34	0.49	0.34	0.26
	Good	N	23.00	23.00	23.00	23.00
		Mean	3.41	3.71	3.45	3.51
		Std. Deviation	0.54	0.64	0.53	0.47
	Average	N	18.00	18.00	18.00	18.00
		Mean	3.38	3.60	3.37	3.42
		Std. Deviation	0.50	0.66	0.48	0.456
	Poor	N	1.00	1.00	1.00	1.00
		Mean	2.61	3.75	2.88	3.00

M	Good	N	9.00	9.00	9.00	9.00
		Mean	3.41	3.58	3.31	3.43
		Std. Deviation	0.61	0.95	0.74	0.70
	Average	N	25.00	25.00	25.00	25.00
		Mean	3.09	3.73	3.10	3.29
		Std. Deviation	0.65	0.65	0.55	0.45
	Poor	N	3.00	3.00	3.00	3.00
		Mean	3.05	3.58	2.92	3.15
		Std. Deviation	0.75	0.56	1.18	0.79

Table 4:- Correlation between the overall class average score with reading strategies

Overall mean scores	Global strategy	Support reading strategy	Problem solving strategy	Overall strategy	Predictor
	0.228	0.284	0.16	0.27	R
	0.034*	0.008**	0.128	0.011*	Significance (p)
	86	86	86	86	n

*significant ($p<0.05$)
** Highly significant ($p<0.01$)

Table 5:- Regression analysis by general multivariate linear model: predicting academic performance based on the reading strategies

Source		Type III Sum of Squares	df	Mean Square	F	P Value	R Squared
academic score	G- MEAN	2.58	3	0.86	2.65	0.05*	0.09
	P-MEAN	2.82	3	0.94	2.13	0.10	0.07
	S- MEAN	2.93	3	0.98	3.06	0.03*	0.10
	O- MEAN	2.43	3	0.81	3.50	0.02*	0.11

*significant ($p<0.05$)
G- global reading strategy; O- overall reading strategy; S- support reading strategy; P- problem solving strategy

Discussion:-

The medical curriculum is vast and ever expanding. Constantly evolving newer research and innovations make it mandatory for the medical student or a medical graduate to keep learning and improving his skills. To give the best possible treatment to his patient the doctor has to assimilate huge amounts of information in short periods of time which bring to light the importance of fast, quick, effective reading and retention. This also highlights the importance of a conscious assimilation process of effective reading strategies. Whether the individual is a student or a doctor, he is ultimately a learner and the importance of the learning lies in its outcome. The role of metacognition in reading strategies has been debated upon by researchers but its value has been undermined since it is still not a part of the medical curriculum. This arena is yet to be explored. The present study is designed keeping this lacuna in mind.

Table 1 gives descriptive statistics of the performance of our medical students. As per the university norms a score > 75% (very good) is taken as distinction and this is basis of our classification of students into the very good category. A student who obtains marks between 65-75% are considered as first class holders (good), while students getting 50-65% have average scores, and scorers less than 50% are poor students academically. Out of 86 students who were the participants in the study, 8% were found to be very good, 37% were good, 50% average and only 5% of our students are poor. As our students are admitted on the basis of merit in national and state entrance exams, they are expected to perform well. The students were marked for all the three first year subjects, Anatomy, Physiology and Biochemistry, but the overall average scores of each individual student was considered for the purpose of analysis and discussion.

On analyzing the reading strategies adopted by the 86 students included in the study, it was found that all the students preferred to use problem solving strategies compared to other subscales (Panchu P, Bahuleyan B et al, 2016) (Yen-ju Hou, 2013) (Madhumathi P and Arjit Ghosh, 2012) (Mohadeesh Rastakhiz and Mansoureh Roudgar Safari, 2014). Since this is a common strategy employed by all our students, we believe that it may not have any significant influence on the academic outcome. On comparing the other two subscales, we note that very good students used more of support reading strategies than global strategies while, good and average students had equal use of global and support reading strategies. The students who have not fared well academically (<50%) were found to use more of global reading strategies than support. This reveals the role of support reading strategies to become a skilled reader which in turn reflects on their academic outcome. Some researchers concur with these findings, but most of the studies were done in school children (Salarifar MH and Pakdaman SH, 2009) (Haffman B and Spatariu A, 2008). The role of metacognitive awareness of reading strategies in the medical field is still a virgin territory with Javedi et al having made some inroads into it (Javadi, M, Keyvanara M et al, 2010). In India, ours is the first kind of study done in this arena.

On analysis of table 3, we find that the overall usage of reading strategies was better in women as seen in the study done by Panchu P et al (Panchu P, Bahuleyan B et al, 2016). In depth comparison shows that academically very good category of students are females. On comparing the overall strategy usage of good scorers, females are high frequency users while males are only medium users. Further we observe that while comparing the subscale strategy usage, females using problem solving, support reading and global strategies in this order tend to perform very well academically. Females who are good academically when compared to their male counterparts prefer problem solving, support and global strategies in that order, but the strategy usage levels are only medium. We would like to extrapolate that if they had better usage of strategies they may have been able to reach the 'very good' category. Of special interest was the strategy usage by the poor scorers of both sexes, and it was found that females have the same preferential use of strategies as the very good and good female scorers, but the level of strategy use was low. Of the 86 students, only one girl fell into the poor category of scorers while there were 3 boys. Among the male students, the poor scorers had only medium level of global strategy and support strategy usage but the former was preferred. These findings are in concurrence with Yen ju Hou et al, Madhumathi et al and Rastajguz et al (Yen-ju Hou , 2013) (Madhumathi P and Arjit Ghosh , 2012) (Mohadeesh Rastakhiz and Mansoureh Roudgar Safari, 2014). Mokhtari et al has emphasized that usage of problem solving strategy is the key factor in determining the academic outcome (Panchu P, Bahuleyan B et al, 2016). Our findings refute the findings of Mokhtari et al. In our study group, all the 86 participants were high frequency users of problem solving strategies. Multiple reasons may be assigned for this observation from the culture of India to the teaching methodologies adopted in schools in India. More studies are required in this field to shed light on this conflicting result.

Table 4 shows that there is a statistically positive correlation between the different subscales and the overall strategy utilization with academic performance with the exception of problem solving strategy. This finding is somewhat similar to the studies done by Mousavi et al except for the fact that in our students, problem solving strategy is not positively correlated with academic performance (Hossein Mousavi S, Saeed Mousavi et al, 2015). Positive correlation of support reading strategy with academic outcome is highly significant. It is required for the medical students to be skilled and effective learners and the observations made by the other researchers may not be applicable to this unique subset of students. With an evident lack of information in this regard, the students are at a disadvantage because remedial measures cannot be implemented. Further research in this field is hence advocated.

Table 5 shows the regression analysis done by general multivariate linear model. Based on statistics post-hoc range test and multiple comparison (Tukey's method), we find that global reading, support reading and overall strategies are predictors of academic performance in medical students. Our findings are in conflict with the findings of Mousavi et al (Hossein Mousavi S, Saeed Mousavi et al, 2015). The possible explanation for this may be that our study group comprises of adult learners who are more aware of problem solving strategies.

Conclusion:-

Awareness of reading strategies has a definite role to play in predicting academic performance. Inculcation of these strategies in the educational curriculum would be highly advantageous to achieve meaningful learning. To improve the academic outcome and quality of life, all efforts must be made to bring the process of conscious awareness of reading strategies to the point of automaticity thus acquiring a skill.

Acknowledgement:-
We are grateful to all the students participated in the study. We also thank Mr. Tom Thomas, Biostatistician, Jubilee Mission Medical College, who helped us in data analysis.

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