Influence of Research Infrastructure, Teachers' Motivation and Career Opportunity on Students' Attitude towards Research

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Abstract: Research skill and temper not only helps in rational decision making but also facilitates positive change in every dimension of social life and such attitude must develop from the undergraduate level. In the light of this, the present research work tried to assess the factors which stimulate students' temper towards research. The influence of teacher's motivation and research infrastructure on students' attitude towards research is studied along with the mediation effect of career opportunity. Data are collected through scheduled questionnaire method from B. Com and M. Com final semester students from different colleges of western Odisha. Structural equation model is applied to study such effect. It is found that teacher's motivation and research infrastructure have no direct effect but has mediated effect on student's attitude. So, the policy makers should focus providing career opportunity to the students in research to ignite research attitude among them from the graduate level.

1. Introduction

Research skill and knowledge has become indispensable in every field nowadays and students being the future are in need to develop rational attitude towards it. Research experience has prodigious value in students' life and helps them in various fields (Petrella and Jung, 2008). But it has been witnessed that many students at graduate and post-graduate level assume that research is unnecessary and they somehow complete their project papers. Most of them prepare projects but only few of these go for publication (Saini *et al.*, 2020).Their attitude can be turned positively towards research by assigning research homework which is interesting and related to their practical life (Emsen *et al.*, 2011).

Moreover, students should be provided with grants to get motivated to participate in more numbers and more seriously (Ünver *et al.*, 2018; Purani, 2014). Teachers also have an important role in shaping and motivating students attitude towards research (Okyere, 2013). It is also a fact that peer groups have a significant impact on the attitude of the young students (Guimond, 1999). Though some studies

opined that gender has a role in affecting the research attitude (Memarpour *et al.*, 2015; Saleem, 2015), some others differed in their opinions (Hussain *et al.,* 2016).

Studying the attitude is a difficult job mainly due to the involvement of psychological factors. Family background of the students also affect their attitude to a great extent(Jena, 2020). Considering all these factors, the current study attempts to study the impact of research infrastructure and teachers' motivation on research attitude of the students mediating career opportunity.

2. Review of Literature

2.1. Teacher's Motivation and Student's Attitude

Kurniawan *et al.* (2019) investigated the students' attitude towards natural science and found that teachers should ensure creativity and dynamism to influence the attitude of the students. Shaukat *et al.* (2014) analysed the postgraduate students' attitude towards research and stated that the teacher's educational programs must be improved to develop positive attitudes in the students towards research. Ramsay *et al.* (2020)studied the impact of teaching courses on attitude of the students and found that there is no significant impact of such course but a better version of teaching may lead to a better attitude in future. Siemens *et al.* (2010) found that participation of the students in research can be increased by removing barriers like short time period and unavailability of good mentors. Garancho *et al.* (2019) found that teachers' motivation plays a major role in developing a positive attitude in students towards research. Butt (2013) stated that low student-teacher attitude leads to a negative attitude in students for research and preparation of teachers through various programs will be helpful in developing right attitude in students for research.

2.2. Research Infrastructure and Students' Attitude

Ismail *et al.* (2014) made a comparative study on students' attitude of two universities towards research activity and found that there were no such differences but there were certain barriers like time, training and presence of the supervisors in research interest which demotivate students. Kaur (2016) studied the attitude of students towards research and discovered that research courses improve the confidence level in students and influence their attitude positively. Memarpour *et al.* (2015) found that proper input on theory and practical in institutional level can help the students dive deep into the research process. Borden *et al.* (2008) studied the impact of seminars on students' attitude and behaviour and found it to be positive. Nusrath *et al.* (2020) also substantiated that the orientation program helps to motivate students for conducting research activities. Kakupa and Xue (2019) found that the relationship between the research course and anxiety level is significant and taking more research courses reduces the anxiety level.

2.3. Career Opportunity

Chandramohan and Ramesh (2019) studied the attitude of doctoral students and found that most of them are aiming a good career option but they need proper training for that. Bridle *et al.* (2013) found that a better funding scheme and a better network can lead to a better early research career. Bhalerao

and Prasad (2016) studied the interns' attitude towards research as a career and discovered that nobody had research as his/her first professional choice. Browning *et al.*(2017) observed the journey of researchers and found that researchers must be passionate towards research to have a good and consistent career. Patel (2019) found that many students are interested in research as it provides good career opportunities and wants research as a subject in their course curriculum but there are also a number of students who are not aware of the opportunities.

2.4. Students' Attitude towards Research

Abun *et al.* (2019) found that the attitude of students affects their intention to carry out research in future. Oguan *et al.* (2014) studied the attitude and anxiety of students towards research and discovered that students having a good academic achievement have low anxiety in research and vice versa. He also found that students' attitude is positively related to academic achievement. Aziz *et al.* (2018) made a study on the perception of students and found that students at undergraduate level feel the necessity of research but they cannot excel in this field because of some barriers like work pressure and lack of time. Chandramohan and Ramesh (2019) found that many students chose research because they were very much interested for it. Emsen *et al.,* (2011) found that research can be made more interesting for students if they are given some research assignment concerned with their real life and this way their attitude can be more positive.

Many studies in the past have been undertaken in the concerned area but a little attention has been extended towards the research attitude of students from career perspective. Though attempts have been made to study the students' attitude through various factors, only a few researchers have pointed the mediating impact. So far as methodological gap is concerned, a smaller number of researchers applied structural equation modelling with a mediating factor which would have resulted a robust result. The present study explores the impact of research infrastructure and teachers' motivation on the students' attitude towards research with the mediation impact of career opportunity which is a lack in the reviewed literatures.

3. Objectives and Hypotheses of the Study

3.1. Objectives of the Study

The research is carried on with the following objectives:
- To assess the influence of research infrastructure on student's attitude towards research.
- To measure the influence of teacher's motivation on student's attitude towards research.
- To trace the mediation impact of career opportunity on student's attitude towards research through research infrastructure and teacher's motivation.

3.2. Hypotheses of the Study

Following hypotheses are formulated based on objectives and after reviewing the existing literatures:

H_{01}: There is no influence of research infrastructure on students' attitude towards research.
H_{02}: There is no influence of teachers' motivation on students' attitude towards research.

H_{03}: There is no mediation impact of career opportunity on students' attitude towards research through research infrastructure and teachers' motivation.

4. Research Methodology

4.1. Sampling and Data Collection

The target population for the present study is the undergraduate and post graduate final year commerce students of western Odisha. All the authors of this research work belong to western part of Odisha which enables them for easy collection of data from the concerned students through google forms during the pandemic. Thus, the scope of the study is confined to western part of Odisha only. Probability sampling method is used for the selection of samples from the population. A scheduled questionnaire was formed through google forms and its link was sent to the groups formed on WhatsApp Messaging Application for online classes of different colleges. A total of 482 responses were received. After checking unengaged responses, 445 responses were finalised. These sample units correspond both the criteria advocated by Kline (2011) & Weston and Gore (2006). Kline (2011) argued that there may be 10 to 20 units required for per estimator. Weston and Gore (2006) proposed that sample size must be at least 200 for structural equation modelling.

The first part of the questionnaire replicates demographic information. The second part assembles Research Infrastructure (RI) with three variables, the third part collects information regarding Teachers' Motivation (TM) with three variables, the fourth and the fifth parts include Career Opportunity (CO) and Student Attitude (SA) with four observed variables each. Variables are rated with 5-point Likert Scale with 1 (Strongly Disagree) and 5 (Strongly Agree). SPSS 23 and AMOS 20 are used for data analysis.

4.2. Reliability and Validity Estimates

For reliability and validity estimates, following threshold values are considered.
Reliability
Cronbach's Alpha > .70 (Cronbach, 1951; Nunnally, 1978; Cortina 1993)
Composite Reliability > .70 (Bagozzi and Yi, 1988, Dragan and Topolsek, 2014, Razak *et al.*, 2019)
Convergent Validity: Average Variance Extracted (AVE) > 0.50 (Hair *et al.,* 2017)
Discriminant Validity: HTMT Score <.90 (Henseler *et al.*, 2015; Alarcon and Sacchez, 2015)

Table 1: Reliability and Validity Estimate

Constructs	Cronbach's Alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)
RI	0.80	0.79	0.57
TM	0.82	0.82	0.61
CO	0.85	0.80	0.62
SA	0.86	0.86	0.61

Source: Authors' Own Compilation

Cronbach's Alpha, Composite Reliability (CR) and Average Variance Extracted (AVE) are corresponding with the above criteria.

Table 2: Discriminant Validity with HTMT Score

	RI	*TM*	*CO*
RI			
TM	.86		
CO	.76	.59	
SA	.59	.58	.73

Source: Authors' Own Compilation

Above table replicates discriminant validity with Heterotrait-Monotrait(HTMT) Ratio of Correlations advocated by Henseler *et al.* (2015) by disapproving Fornell and Larcker (1981) criteria which is applicable when sample size is more than 500.The estimates HTMT score is within the threshold value. Hence, the reliability and validity criteria of the proposed model is said to be satisfied.

Table 3: Model Fit Indices

Model Fit Indices	*Recommended Value*	*Obtained Value*
Chi-square/df (Hinkin,1995)	< 3.00	2.428
GFI (Hooper *et al.,* 2008; Bagozzi & Yi, 1988)	>0.90	.946
AGFI (Muenjohn & Armstrong, 2008)	>0.80	.920
RMSEA (Bollen, 1989; Browne and Cudeck, 1992)	<0.10	.057
CFI (Byrne, 2016)	>0.80	.971
TLI (Browne and Cudeck, 1992; Byrne, 2016)	>0.95	.963

Source: Authors' Own Compilation

Note: GFI : Goodness of Fit Index; AGFI: Adjusted Goodness of Fit Index; CFI: Comparative Fit Index; RMSEA: Root Mean Square Error of Approximation; TLI: Tucker Lewis Index.

The model fit criteria are corresponding with the obtained values. Thus, the estimated model is termed as a fit model.

A greater number of male respondents have participated in the research process as compare to female respondents. Similarly, a greater number of B. Com students than M. Com students have responded. The demographic profile infers that a greater number of students are male and belong to urban area and from business family.

<p align="center">**Table 4: Profile of Respondents**</p>

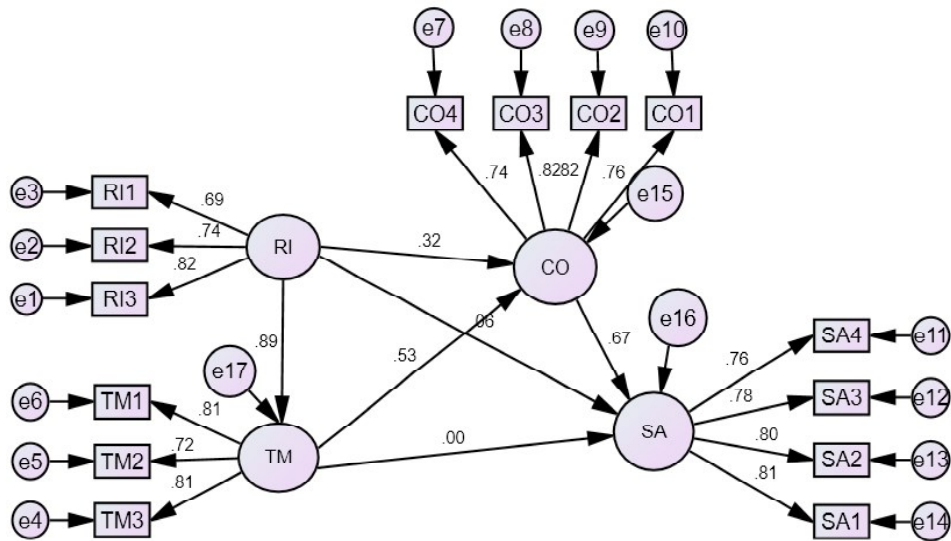| *Variables*	*Frequency*	*Percentages*
Gender		
Male	240	54
Female	205	46
Class		
B. Com	265	60
M. Com	180	40
Father's Occupation		
Business	165	37
Service	147	33
Farming	79	18
Profession	54	12
Residential Area		
Rural	147	33
Urban	192	43
Semi-Urban	106	24

Source: Authors' Own Compilation

Figure 1: Path Analysis of the Model

Source : Authors' Own Compilation

Table 5: Structural Parameters

	Hypothesis		Estimate	S.E.	C.R.	P	Remark
TM	<—-	RI	.888	.052	15.488	***	Supported
CO	<—-	TM	.533	.117	3.954	***	Supported
CO	<—-	RI	.318	.106	2.389	.017	Supported
SA	<—-	CO	.672	.110	6.584	***	Supported
SA	<—-	TM	.002	.147	.014	.989	Not Supported
SA	<—-	RI	.062	.127	.417	.677	Not Supported

Source: Authors' Own Compilation

5. Model and Discussion

It is found in the above figure and table that research infrastructure or facility has no direct impact on student's research attitude. But it has indirect impact through career opportunity on student's attitude which was supported by Ismail *et al.* (2014) & Vairamani and Akoijam (2018) but Kaur (2016) propped a different opinion that availability of research course can motivate students. Similarly, teacher's motivation does not directly influence students to pursue research. But it has indirect impact through career opportunity. Thus, the model is termed as a full mediation model. In addition, research infrastructure has significant impact on teacher's motivation. But some studies found contrast result i.e. teachers' motivation is directly related to students' motivation and attitude(Pawar, 2019).

Table 6: Sobel Test for Significance of Mediation

DV-MV-IV*	Sobel Statistics	P Value
RI-CO-SA	2.60	0.004
TM-CO-SA	3.51	0.000

Source: Authors' Own Compilation

*Dependent Variable-Mediation Variable-Independent Variable.

Above table reflects significance of mediation by Sobel test. Both the critical paths with the common mediation variable are significant at 1% level (Sobel, 1987; Baron *et al.,* 1986). Thus, mediation is said to be significant. In addition, the difference between standardised regression weights before and after addition of common latent factor is less than .02 which infers that the model is free from common method bias (MacKenzie and Podsakoff, 2012).

6. Policy Implication

It is evident from the model that availability of research infrastructure like availability of ICT facility viz. free internet, computer, statistical software, access to data base and organising seminars,

workshops etc. It cannot ignite student temper towards research. Moreover, it is seen that the state universities of the geographical region under study fail to provide sufficient infrastructure required for research. Students are not getting proper access to database like Bloomberg or CMIE. However, they are getting INFLIBNET access which is not sufficient. So, this problem should be considered.

Similarly, the model also suggests that teacher's motivation also does not have direct impact on research attitude of a student. But a teacher can motivate a student towards research when many career options are available or when a student can realise that research skill will develop an analytical power which will be helpful in problem solving and decision making at professional level. It is the teacher or guide who has a significant impact on the research activity of the student. If the teacher is an expert in the research field and he has a high motivating ability, this will definitely accelerate the research work of the student. And when the teacher is more aware about the career opportunities available in the research field and is capable of informing and guiding his students towards the availability of a good career by developing problem solving and decision-making ability in them, it will have a robust impact. Because It has been seen that many students have good attitude towards research but they do not show much interest in choosing research as career (Park *et al.,* 2010)**.** So, teacher's motivation and availability of research infrastructure can influence student's attitude towards research when many career options are available. This is in line with (Pawar, 2019) findings. Ismail *et al.* (2014) also argued that lack of interest of the supervisor towards research can demotivate students' attitude towards research. So, improving all the said areas will lead to better satisfaction of the students and they can enjoy research in more fruitful manner.

7. Conclusion

Research is a concept of universal applicability and positive attitude of the students with improved infrastructure can yield robust result. Though some studies concluded that the students have negative attitude towards research (Saini *et al.,* 2020), teachers should try to remodel their teaching process to ensure a more positive environment (Kurniawan *et al.,* 2019). This is due to various factors like lack of proper guidance, unavailability of research facilities; wrong perception etc. So, a student must have been continuously motivated to acquire research skill as it is helpful in their professional life to make rational judgement apart from the contribution towards country's scientific development. As the findings of the study focus on the career opportunity, this should be used by the teachers as a major tool to motivate students for research. Moreover, Browning *et al.,* (2017) has added that universities and colleges need to nurture and invest on their researchers from very early in their career. So better career opportunity should be ensured and communicated to students during under graduation and post-graduation studies.

This study is limited to the western part of Odisha with a smaller number of colleges. So, studying a larger region will give a clearer view of the proposed model. Apart from this factors other than research infrastructure, teachers' motivation and career can be taken into consideration to study their impact on students' attitude towards research with nomological validity testing, F and Q square statistics which can make the outcome more robust.

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Appendix

Appendix 1: Factors and Variables

Factors	Label	Variables
Research Infrastructure (RI) (Kuwaiti, 2014)	RI1	ICT facility is required for research
	RI2	Access to database is essential
	RI3	Organizing symposium, seminars, workshops and conferences motivates research
Teacher's Motivation (TM)	TM1	Faculties should have adequate research knowledge (Kuwaiti, 2014)
	TM2	Degree of involvement of the teacher should be more (Kuwaiti, 2014)
	TM3	Faculty members should be motivating towards research
Career Opportunity (CO)	CO1	Research helps in professional life problem solving
	CO2	Research helps in professional decision making
	CO3	Research leads to better management
	CO4	Research leads to better career option (Saud *et al.,* 2017; Park *et al.,* 2010)
Student's Attitude towards research (SA) (Aziz *et al.,* 2018; Vairamani & Akoijam, 2018)	SA1	I am interested in research (Papanastasiou, 2005)
	SA2	Research gives me personal satisfaction
	SA3	Research helps in developing my analytical skill
	SA4	I enjoy research(Papanastasiou, 2005)

Source: Authors' Own Compilation

Appendix 2: Factor Loadings

	CO	RI	SA	TM
CO1	0.75			
CO2	0.76			
CO3	0.83			
CO4	0.74			
RI1		0.69		
RI2		0.74		

contd. appendix 2

	CO	RI	SA	TM
RI3		0.82		
SA1			0.81	
SA2			0.80	
SA3			0.78	
SA4			0.76	
TM1				0.81
TM2				0.72
TM3				0.81

Source: Authors' Own Compilation