ISSN 0973-6190

VOL. 60 (1)

JANUARY - MARCH 2023

Peer Reviewed Quarterly Journal

JOURNAL OF EDUCATIONAL RESEARCH AND EXTENSION

SRI RAMAKRISHNA MISSION VIDYALAYA
COLLEGE OF EDUCATION (AUTONOMOUS)
Coimbatore - 641 020

Published by :

Sri Ramakrishna Mission Vidyalaya College of Education
(Autonomous), Coimbatore - 641 020
Phone No.: (+91) 80125 33915, Website: www.srkvcoe.org
E-mail: srkvcoejere@gmail.com

Printed at :

Ramakrishna Mission Vidyalaya Printing Press

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Dr. SEEMA YADAV
Assistant Professor
Department of Education
The Bhopal School of Social Sciences
Bhopal, Madhya Pradesh - 462 024

ISSN: 0973-6190

CONSTRUCTION AND VALIDATION OF METACOGNITION RATING SCALE WITH THE APPLICATION OF CONFIRMATORY FACTOR ANALYSIS

1

S. SUGAVANAM
M.Ed. Scholar
Government College of Education
Pudukkottai, Pudukkottai District
Tamil Nadu - 622 001

Dr. M. BALAMURUGAN
Assistant Professor in Education
Government College of Education
Pudukkottai, Pudukkottai District
Tamil Nadu - 622 001

INTRODUCTION

Metacognition is one of the emerging concepts in the field of education. It was first introduced by Flavell in 1976. In its shortest sense, metacognition is about "thinking about thinking". Flavell first introduced the term metacognition as "one's knowledge concerning one's own cognitive processes and products or anything related to them." It includes "the active monitoring and consequent regulation and orchestration of these processes in relation to the cognitive objects or data on which they bear, usually in the service of some concrete goal or objective." Although the term has been part of the vocabulary of educational psychologists for the last couple of decades, and the concept for as long as humans have been able to reflect on their cognitive experiences, there is much debate over exactly what metacognition is. However, it was not Flavell who first studied metacognition. In the early twentieth century, researchers have documented the great importance of monitoring and regulating one's comprehension process. Information processing models from the 1970s included executive control system that regulates basic cognitive processes. Vygotsky, (1986) and Piaget, (1978) also added self-regulation and self-reflection in their cognitive development theory. Self-regulation and self-reflection are in fact metacognition. Metacognition is the knowledge of one's own thoughts and through processes, involves both conscious awareness and the capability of communicating one's rationale. After the work of Flavell, many researches have been conducted and a lot of new findings came up. One of the recent definitions of metacognition is that it is the students' awareness of themselves as learners. Also, it refers to the meta-level knowledge and mental actions used to steer cognitive processes (Jacobs & Paris, 1987).

They are closely related and can often overlap. Schraw et al., (2006) elaborated upon the definition of metacognition:

"Knowledge of cognition includes the awareness of what one knows, how one learns, what strategies one knows, and when one implements strategies. Regulation of cognition includes planning, monitoring, and evaluation. Planning involves one's connection to previous knowledge, plan for using strategies, and use of time. Monitoring is one's self-checking at each stage of the task. Evaluation includes the learner's appraisal of the outcome and reflection on what new knowledge he or she gained". Metacognition is a subdivision of cognition, or a type of cognition. It is defined as the scientific study of an individual's cognitions about his or her own cognitions. Basically, metacognition is the self-reflection of cognition. On the other hand, cognition refers to mental process that includes memory, attention, producing and understanding language, reasoning, learning, problem-solving and decision making. It is often referred to as information processing, applying knowledge, and changing preferences.

According to Perkins, (1992) defined four levels of metacognitive learners: tacit; aware; strategic; reflective. The 'Tacit learners are unaware of their metacognitive knowledge. They do not think about any particular strategies for learning and merely accept if they knows something or not. Meta-cognition is the process of thinking about one's own thinking. It refers to the processes that are used to plan, monitor, and assess one's understanding and performance. It also includes a significant awareness of one's thinking and learning. Metacognition refers to the cognitive control and monitoring of first-order cognitive processes. Meta means 'beyond' and cognition means, 'to know'. Metacognition means to go beyond just knowing to understanding how you know what you know (Shetty, 2014). Few instruments like Metacognitive Awareness Scale, Domain Specific (MCAS-DS) (Song et al., 2021), Metacognitive self-assessment scale (Faustino et al., 2021), The Metacognition in Self-Control Scale (MISCS) (Bürgler et al., 2022), Metacognitive Thinking Skills Scale (Tuncer & Kaysi, 2013), and Metacognition Self-Assessment Scale (MSAS) (Semerari et al., 2017) were referred in constructing the present tool.

MAJOR OBJECTIVE

The objective of the study was to develop a student Metacognition Rating Scale (MCRS) for higher secondary school students through confirmatory factor analysis.

ITEM FRAMING

The items were framed by referring to the concepts and definitions cited in the foregoing pages, a few statements from the review of literature on the subject and also by discussions with experts in the field of education and psychology. These sources have provided the base for the development of metacognition scale. An item conveying the idea most clearly was retained, and the language of the item was made simple and suitable to express the concept implied. This process of scrutiny

and evaluation yielded 36 statements as shown in Table 1.

Metacognition Rating Scale (MCRS) was prepared with two hypothetical constructs namely primordial metacognition and progressive metacognition. Primordial metacognition involves the basic aspects of metacognition like planning, organizing and monitoring. Planning involves deciding what students need to learn, and then deciding how they are going to learn that material. Organizing is the consolidating and sense making in learning. It is used to describe how students develop an awareness of their own thinking and learning how to learn. Monitoring requires asking, how I am doing at learning this, constantly tracking what I have learned, what I don't know yet, and whether my study strategies are helping myself to learn effectively.

Whereas progressive metacognition involves the advance aspects of metacognition like, problem solving, evaluation and cognitive confidence. Problem solving is the ability to how we approach the problem, how we choose the strategies to find a solution, or get a comprehensive outlook about the problem. Evaluation involves reflection on how well students met their learning objectives after completing a unit of study, or receiving feedback (such as a test or assignment) and it is an assessment of one's own ability, knowledge, and understanding of task-relevant factors. Cognitive confidence is a process that enables students to optimize behaviour such as learning or resource allocation and that serves as the basis of metacognitive reasoning.

Table 1: Items of the Metacognition Rating Scale with their Hypothetical Constructs

S.No	Code	Statements/ Items
		Primordial Metacognition
1.	MC1	I start any work only after setting the goal.
2.	MC2	I usually follows a strict time table for the studies.
3.	MC3	I start any work after studying the guidelines.
4.	MC4	Before starting the study, I collected all the relevant information about the content.
5.	MC5	I starting learning only after getting a clear picture about the content to be learned.
6.	MC6*	I prefer to study only during the exams.
7.	MC7	I can create appropriate situation for my study.
8.	MC8	I split the learning task into simple units.
9.	MC9	I would like to use Mnemonics, concept maps in my studies.

S.No	Code	Statements/ Items
10.	MC10	I summarize what I study to recollect information in the text.
11.	MC11	I like to collect meaningful and important information
12.	MC12*	I go back once I start the work.
13.	MC13	I do not like interference by others while I do my works.
14.	MC14	I check myself, whether I progress in the right direction.
15.	MC15	I finish studying all the lessons well before the exam.
16.	MC16	I like to complete my home work within the time schedule.
17.	MC17	I spend enough time to speed up the learning.
18.	MC18*	I involved in other activities during study
		Progressive Metacognition
19.	MC19	I evaluate my learning from every work I do.
20.	MC20	I prefer to answer the easy question first.
21.	MC21	I always have the habit of checking the answers once again before submitting the answer scripts.
22.	MC22	When learning a new content, I compare it with the previously learned things.
23.	MC23	I think twice before taking a decision.
24.	MC24*	I do not like to answer the difficult questions.
25.	MC25	I know every problem have the solution.
26.	MC26	I can understand a problem in depth
27.	MC27	When I facing a problem, I often compare it with the problems which I have previously solved.
28.	MC28	I always ask myself, whether I have gone for all other possibilities before selecting a final solution.
29.	MC29	I investigate myself by asking whether I have enough talent to solve a problem.
30.	MC30*	I won't predict the things before it happens.
31.	MC31	I have confidence in my memory.
32.	MC32	After the successful completion of each learning task, my self-confidence increases.
33.	MC33	Whenever doing a task, I completely engage in it.
34.	MC34	I consider my failures as milestone towards success.
35.	MC35	I am efficient in rectifying my own weaknesses.
36.	MC36*	I have difficulty keeping my mind focused on one thing for a long time.

Note: * = Negative Items

SCORING PROCEDURE FOR METACOGNITION RATING SCALE (MCRS)

The Metacognition Rating Scale consists of 36 items which comprises of positive and negative items. The Likert type responses were used in the inventory. A total of 5 different responses were used. The responses were strongly agree, agree, sometimes, disagree, and strongly disagree. The scores were given as for 5 for strongly agree, 4 for agree, 3 for sometimes, 2 for disagree, 1 for strongly disagree for the positive items. The negative items were score in the reverse order like 1 for strongly agree, 2 for agree, 3 for sometimes, 4 for disagree, 5 for strongly disagree. A totally of 180 is the maximum score. There are only six negative statements i.e. statements 6, 12, 18, 24, 30 and 36, the rest of the statements are positive. From the table 1, it can be seen that there 18 items included in primordial metacognition dimension of the tool, and rest of the 18 items in progressive dimension.

EXPERT EVALUATION OF THE MCRS ITEMS AND PRELIMINARY TRY – OUT

To establish the content validity of the tool, the items were subjected to expert scrutiny. The experts were drawn from the fields of Education. Their suggestions were considered and necessary modifications to the scale were made. The items were arranged in random order and administered to a sample of 30 students to check their applicability. Necessary modifications were then made with the experience gained through this preliminary try-out.

POPULATION AND SAMPLE

In the present study, the population constitutes the XI standard students out of which the target population are XI students of select schools of Pudukkottai District. The sample was taken from 8 schools of Pudukkottai District comprising rural, urban and semi-urban area. The sample distribution based on gender, type of school, school management, medium of instruction, location of the school, and stream of study is shown in Table 2.

Table 2: Sample Distribution

Variables	Categories	Frequency	Percentage
Gender	Boys	171	53.8
	Girls	147	46.2
Type of School	Boy's School	33	10.4
	Girls School	33	10.4
	Co-Ed School	252	79.2
School Management	Government	163	51.3
	Aided	76	23.9
	Private	79	24.8

Variables	Categories	Frequency	Percentage
Medium of Instruction	Tamil	202	63.5
	English	116	36.5
Location of School	Urban	175	55.0
	Rural	80	25.2
	Semi-Urban	63	19.8
Stream of study	Science	184	57.9
	Arts & Commerce	134	42.1
Total		318	100

ITEM – TOTAL CORRELATION

For the tool development one of the basic and important step is to apply item total correlation for increasing reliability and validity of items (Balamurugan & Kumaran, 2008). The details of the item total correlation is shown in Table 3. For selecting the valid items required for the factor analysis, item-total correlation coefficients were calculated. Then it was decided to select items that are significant at 0.001 level with a correlation coefficient r-value greater than 0.2. Thus item total correlation yielded 31 out of 36 items with dropping of five items.

Table 3: Item – Total Correlation

Item No.	Pearson Correlation (r)	Sig. (2-tailed)	Decision
MC1	.369**	0.000	Selected
MC2	.185**	0.000	Not Selected
MC3	.402**	0.000	Selected
MC4	.323**	0.000	Selected
MC5	.377**	0.000	Selected
MC6	.244**	0.000	Selected
MC7	.449**	0.000	Selected
MC8	.384**	0.000	Selected
MC9	.231**	0.000	Selected
MC10	.372**	0.000	Selected
MC11	.416**	0.000	Selected
MC12	.375**	0.000	Selected
MC13	.170**	0.000	Not Selected
MC14	.588**	0.000	Selected
MC15	.328**	0.000	Selected
MC16	.380**	0.000	Selected
MC17	.395**	0.000	Selected

Item No.	Pearson Correlation (r)	Sig. (2-tailed)	Decision
MC18	.247**	0.000	Selected
MC19	.448**	0.000	Selected
MC20	.477**	0.000	Selected
MC21	.557**	0.000	Selected
MC22	.527**	0.000	Selected
MC23	.619**	0.000	Selected
MC24	.216**	0.000	Selected
MC25	.559**	0.000	Selected
MC26	.472**	0.000	Selected
MC27	.191**	0.000	Not Selected
MC28	.547**	0.000	Selected
MC29	.442**	0.000	Selected
MC30	0.056	0.323	Not Selected
MC31	.573**	0.000	Selected
MC32	.643**	0.000	Selected
MC33	.552**	0.000	Selected
MC34	.557**	0.000	Selected
MC35	.449**	0.000	Selected
MC36	0.067	0.235	Not Selected

Note: ** significant at 0.01 level and * significant at 0.05 level

KAISER-MEYER-OLKIN (KMO) MEASURE OF SAMPLING ADEQUACY

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy provides an index (between 0 and 1) of the proportion of variance among the variables that might be common variance (i.e., that might be indicative of underlying or latent common factors). For the present study, the KMO measure of sampling adequacy was employed to identify the validity of the scale, which was found to be 0.866. For the df of 465, the approx. Chi-square value for Bartlett's Test of Sphericity was identified as 2235.841, which was found to be significant at 0.001 level. This estimation proved to be appropriate for the factor analysis (Balamurugan, 2013).

EXPLORATORY FACTOR ANALYSIS (EFA)

After item-total correlation, the 31 items were subjected to the factor analysis. The investigator had decided to go with the 2 factors, which coincides with the 2 hypothetical factors namely primordial metacognition and progressive metacognition. Principal Component Analysis with varimax (with Kaiser Normalization) rotation and forced solution of two factors was executed that produced the further refined version,

which converged in 3 iterations as shown in Table 4. Exploratory factor analysis revealed that the items on the final version of SBS loaded on 2 factors, which accounted for 28.23% of the total scale variance (Balamurugan, 2013).

Table 4: Rotated Component Matrix

Items	Progressive Metacognition	Primordial Metacognition
MC25	.738	
MC31	.692	
MC32	.652	
MC20	.652	
MC23	.612	
MC21	.611	
MC33	.585	
MC14	.576	
MC34	.545	
MC29	.544	
MC26	.486	
MC12	.480	
MC28	.443	
MC35	.378	
MC7	.367	
MC10	.362	
MC19	.322	
MC5	.306	
MC15		.628
MC16		.626
MC17		.492
MC22		.485
MC3		.440
MC4		.405
MC8		.377
MC11		.335
MC6		.330
MC9		.308
MC18		.244
MC24		.106

CONFIRMATORY FACTOR ANALYSIS (CFA)

After the KMO measure and factor analysis, the CFA, that is Structural Equation Modelling (SEM) using AMOS (Analysis of a MOment Structures) software ver. 23 was applied for confirmation of factors obtained through EFA.

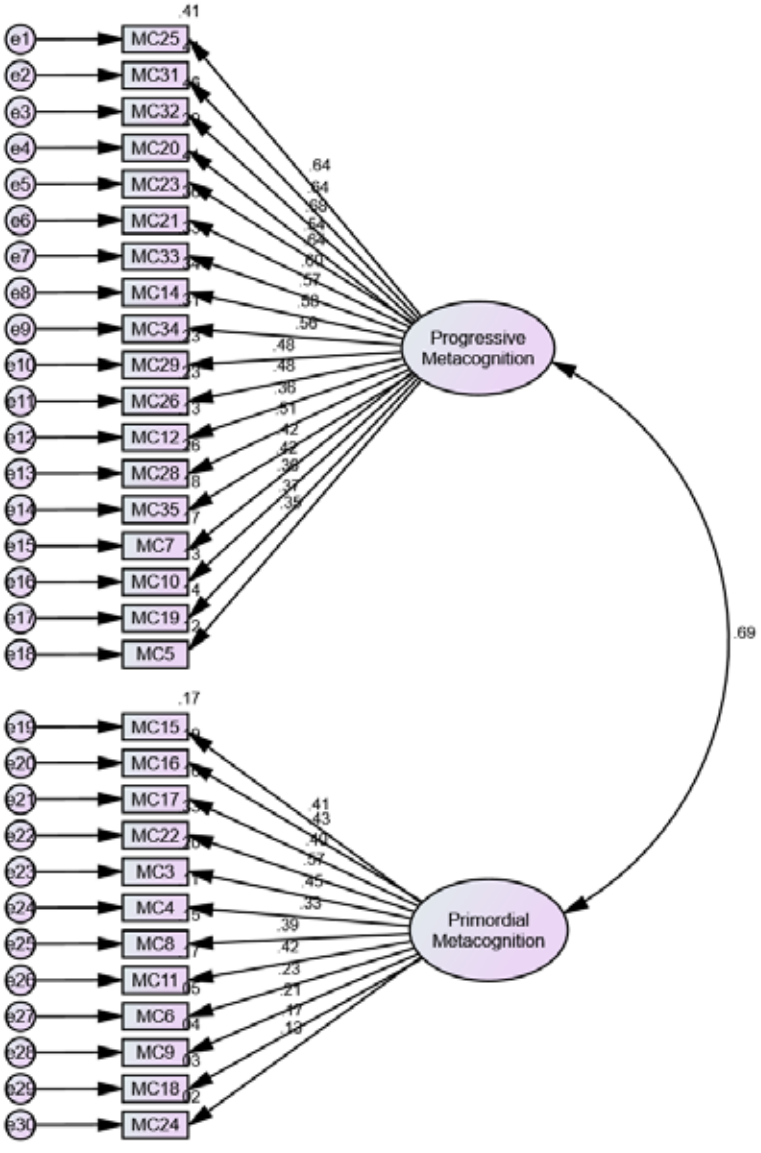

Fig. 1. Structural Equation Measurement Model

SEM of data-driven measurement model with 2 constructs (primordial metacognition and progressive metacognition) obtained from AMOS achieved absolute model fit, the model is recursive (30 items: MC1 was dropped due to model fit suggestion) as shown in figure 1, with CMIN = 716.316, DF = 404, CMIN/DF = 1.773, CFI = 0.828, SRMR = 0.063, RMSEA = 0.049 and PClose = 0.561 (Hair et al., 2006) and was presented in Table 5, thus MCRS is valid. The opinion that a value of about 0.08 or less for the RMSEA would indicate a reasonable error of approximation (Browne & Cudeck, 1993).

Table 5: AMOS Model Fit Estimates

Measure	Estimate	Threshold	Interpretation
Chi-Square (CMIN)	716.316	--	--
Degree of Freedom (DF)	404	--	--
Discrepancy divided by Degree of Freedom (CMIN/DF)	1.773	Between 1 and 3	Excellent
Comparative Fit Index (CFI)	0.828	>0.95	Need More DF
Standardized root mean Square Residual (SRMR)	0.063	<0.08	Excellent
Root Mean Square Error of Approximation (RMSEA)	0.049	<0.06	Excellent
P-value of the null hypothesis (PClose)	0.561	>0.05	Excellent

FINDING

After the statistical treatment of reliability and factor analysis, 30 out of 36 items were retained. It was concluded that the MCRS with 30 items, in its present form was capable of effectively measuring metacognition along with its two factors viz – primordial and progressive metacognition among higher secondary students through confirmatory factor analysis. The final version of the MCRS had a Cronbach's Alpha reliability coefficient of 0.857.

CONCLUSION

The MCRS developed and validated can be used in the field of education and psychology. Even though the MCRS in this research accounted for nearly 28% of the total variance, still this will be well applicable to any research that needs measurement of metacognition. The metacognition measurement have become obvious in the field of education to understand and enhance their learning and retention of the concepts for the longer time among the student community.

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ISSN: 0973-6190

FINANCING HIGHER EDUCATION THROUGH EDUCATION LOANS IN KERALA: A STUDY OF GROWTH, TRENDS AND AWARENESS

2

Prof. KRISHNAN CHALIL
Professor and Head
Department of Development Studies
Dean
School of Social Science and Policy
Central University of South Bihar
Gaya, Bihar - 824 236

MD ASRAUL HOQUE
ICSSR Doctoral Fellow
Department of Development Studies
School of Social Science and Policy
Central University of South Bihar
Gaya, Bihar - 824 236

INTRODUCTION

Human capital refers to the knowledge, skills and health accumulated throughout their lives, enabling them to realize their potential as productive agents of the society. The production skills embodied in workers are known as human capital. Thus, investment in education results in the formation of human capital. One can earn a higher income because of the higher productivity of the more educated or better-trained persons, thus contributing towards human capital formation. It is an accepted fact that investing in human resources through education ensures higher rates of economic returns in the future through the increasing quality of labour. International agencies and countries have been working hard to enhance the member countries' education standards. The U.N. Sustainable Development Goal (S.D.G.) 4 targets that all children, young people and adults achieve at least minimum levels of literacy and numeracy by 2030. The realization of these objectives demands more resources for education. Consequently, various alternative mechanisms like education loans, scholarships, and other avenues have become prominent in the discussion of financing higher education. Banks and other financial institutions are coming forward to develop bankable products for higher education finance. In India, the Reserve Bank of India and Commercial banks are working as partners in ensuring access to education to all in general and backward communities in particular through various policy announcements. The result is that Banking Sector has become an integral part of the higher education financing of our country.

IMPORTANCE AND RELEVANCE OF THE STUDY

In recent years, economic progress has been predicated on the availability

and quality of the information in every given country, which in turn depends on educational access and affordability. As a result, education now has a more significant role to play in producing sufficient and high-quality human capital. The ability of the education sector to operate depends on a variety of resources, mostly financial ones. Given that the higher education system is experiencing a financial crisis (Rani 2009), policymakers and philosophers have given financing higher education substantial consideration. Higher education receives funding from various sources, including public funding, student tuition fees, and additional contributions from philanthropy, business, publishing, and other sources. In India, the Government primarily funds the educational system. The primary source of funding for education was found in the government budget. However, following the implementation of neo-liberal policies and economic reforms in 1991, the state has been reduced to a supporting function, and the market has begun to play a significant role in the provision of education (Tilak, 1993; Tilak, 1993; & Varghese,2021). Public spending on higher education substantially decreased in the 1990s. The affordability and accessibility of education, particularly for the weakest segments of society, have been impacted by the state's turnaround. Nevertheless, this study focuses on whether the education loan is a true alternative to ensuring equity and higher education access. The study's outcome may be relevant in a state like Kerala, where we have a well-developed banking system and increasing demand for higher education. So, one must understand the efficiency of education loans to supplement the governmental efforts in providing higher education to all desirous of pursuing higher education.

REVIEW OF RELATED LITERATURE

Johnstone (2002) assessed student loan programmes in several nations, including Central America, Europe, Africa, the United States, Sweden, Germany, the Netherlands, the United Kingdom, South Africa, and Kenya. Shen and Li (2003) for China, Kim and Lee (2003) for the Republic of Korea, Ziderman (2003) for Thailand, Chung (2003) for Hong Kong, and Kitaevetal (2003) for the Philippines comment on the experience of student loan programmes in Asian nations.

Salmi and Hauptman (2006) contended that need-based grants and merit-based scholarships can be used to increase cost sharing while also promoting more access, equity, and quality, regardless of whether the grants and scholarships are funded by the Government or by cross-subsidies from other wealthy students.

Tilak and Varghese (1991) stated that long-term higher education funding, primarily using public tax money, might not be a desirable course of action. Consequently, some of the alternative policy options are examined, including student loans, graduate taxes, student fees,

public funding of higher education, and the role of the private sector. It is asserted that a discriminatory pricing mechanism would be comparatively more effective and equitable than the other options. Even while the Government must continue to bear a significant portion of the burden for paying for higher education due to socioeconomic and political realities, efforts should be made to develop a funding model that incorporates a variety of funding options rather than depending solely on one. Additionally, it is asserted that laws governing fees and subsidies must distinguish between different levels and types of higher education.

Navaneetha (2014) stated that higher education entails developing minds of the highest calibre and mass-producing domestic labour without sacrificing quality. The expense of education has lately increased. Different universities adhere to different tuition schedules. Most students find it challenging to enter the teaching area. The issue of funding for education has recently taken centre stage. The nationalised and private sector banks handle it through a system of educational loans. The study was approached from the perspective of Coimbatore students or customers who intended to apply for an education loan from the State Bank of India. The report details what drives students to borrow money from the State Bank of India.

Rani (2011) studied student loan procedures and practised them from a global viewpoint and their effects on India. According to the report, student loans are a dangerous form of investment in human capital due to the lack of collateral. This study clarified the necessity of altering the current structure of the school loan programme in India to provide more consideration to society's most vulnerable groups.

Lakshmi (2016) found that compared to students from government-aided colleges, students from self-financing institutions were more committed to seeking employment. All other elements, with the exception of a few contingency factors, are of minor relevance in terms of how a loan should be repaid correctly. Ninety per cent of Kerala's highly educated people experience an increase in N.P.A.s since there aren't enough jobs that match their educational requirements.

The financing of higher education has always been debated across countries. The literature mentioned earlier reveals that various sources have been used to finance higher education within and outside the country. Public funding for higher education is on the decline. Different countries adopt new funding sources such as education loans, graduate taxes, contingent income schemes, and the like. In India, however, public funding is the most sought-after method. But, with the increasing demand for funds and the limited availability of resources, governments have directed the universities to raise the fees and generate internal resources.

OBJECTIVES

- To examine the growth and trend of education loans in South India
- To explore the borrowers' awareness of the education loans scheme
- An analysis of the time it takes for education loans to be approved
- To examine beneficiaries' sources of information about the education loans scheme

METHODOLOGY

This study is based on both primary and secondary data. Primary data required for analyzing the study's objectives were collected from the education loan beneficiaries of Commercial Banks of Kerala. For selecting the education loan beneficiaries, we adopted a two-stage sample method. In the first stage, the state's higher education institutions are identified. Institutions are stratified into Government colleges, Aided colleges, Universities offering professional courses and Self-financing/unaided colleges. As the number of students availing an education loan from Government and aided institutions are very few, they are exempted from the purview of this study. Hence, the students who had benefited from education loans from unaided/ self-financing institutions form the informants. On an examination of the courses for which education loans are distributed, it was seen that Engineering, Nursing and Management were the most preferred courses. Hence, sample borrowers from these three programmes constitute the samples for the present study. On the role, a sample of 120 education loan borrowers continuing their courses in the three streams mentioned above in self-financing colleges were randomly selected. The sample borrowers were students of institutions working in Ernakulum and Kozhikode districts, two districts of Kerala known for its concentration of unaided higher education institutions. All the sample borrowers were the beneficiaries of the S.B.I. Education Loan Scheme. We have used a structured interview schedule for collecting primary data.

Secondary data required for the study were collected from the reports of the R.B.I., I.B.A., and other related websites. Discussions with a few Bank managers were also carried out to evaluate the scheme from their perspectives.

ANALYSIS AND INTERPRETATIONS

In the context of increasing privatization of higher education and demand for more professional education, the poor but meritorious learners should not be in trouble. This realisation led to the development a model education loan scheme by the R.B.I. and the Vidya-Lakshmi Education Portal of the Government of India. Many researchers indeed tried to study the pattern of education loans, their contribution to the N.P.A. of banks and the like. Only a few studies have been carried out examining whether education loan is an effective

alternative to the conventional funding of higher education. In addition, the equity and quality aspects of education loan schemes are seldom examined. These realisations warrant the conduct new study focusing on these researched areas of education loans. This study is an attempt in that direction.

Table 1: Distribution of Education Loan Accounts in the South India States

Year	Andhra Pradesh	Karnataka	Kerala	Tamil Nadu	Telangana	Total South India	All India Total
2004-05	88014	46273	68583	88707	--	293896	489445
2005-06	105923	65110	107003	132586	--	413577	668351
2006-07	149257	87229	156061	225337	--	622827	1026215
2007-08	166493	113403	157277	314923	--	758169	1247083
2008-09	195659	138650	215976	418100	--	976394	1613444
2009-10	218491	161085	246974	574690	--	1211197	1972053
2010-11	220779	172783	289998	717261	--	1412078	2287843
2011-12	215797	173270	308097	822810	--	1532375	2464124
2012-13	197032	186623	336212	886752	--	1621275	2590045
2013-14	190340	195169	341427	940990	--	1682763	2681360
2014-15	170678	198709	331663	960202	--	1675881	2671316
2015-16	104358	203474	323433	891532	69390	1606024	2636624
2016-17	100026	202558	269010	906412	64145	1555514	2547246
2017-18	95305	199942	313356	821454	52916	1502802	2427512
2018-19	92299	195411	294479	742740	54781	1391900	2307871

Source: Ibid

Table 2: Distribution of Education Loan Amounts in the South India States (₹crores)

Year	Andhra Pradesh	Karnataka	Kerala	Tamil Nadu	Telangana	Total South India	All India Total
2004-05	1352.32	551.84	757.06	1001.41	--	3685.88	6694.33
2005-06	2023.19	891.65	1374.54	1863.38	--	6192.78	11296.39
2006-07	2232.23	1154.51	1849.90	2363.08	--	7755.47	14390.99
2007-08	2977.15	1752.98	2414.74	3592.07	--	10797.93	20258.48
2008-09	3970.20	2432.33	3141.59	5184.59	--	14830.29	27746.62
2009-10	4843.06	2915.55	4874.34	7351.67	--	20123.32	36923.74
2010-11	5091.83	3216.25	5282.10	9582.28	--	23343.62	42992.84

Year	Andhra Pradesh	Karnataka	Kerala	Tamil Nadu	Telangana	Total South India	All India Total
2011-12	5058.56	3518.39	5854.58	11709.03	--	26348.37	48220.33
2012-13	4698.58	3874.54	7353.91	13343.65	--	29535.47	52738.67
2013-14	4987.76	4062.52	7975	15077	--	32396.25	57164.17
2014-15	5443.33	4159.33	7788.53	16313.06	--	33993.62	59336.04
2015-16	3461.20	4610.26	8385.58	15297.50	3300.93	35339.06	61831.00
2016-17	3389.86	4621.62	7852.71	15725.98	3011.21	34885.90	62854.00
2017-18	3353.69	4444.77	8388.84	15883.87	2822.38	35186.97	61773.00
2018-19	3387.28	4744.91	7957.76	15017.51	2591.14	33972.70	62456.00

Source: Ibid

COMMERCIAL BANKS AND EDUCATION LOANS

Public sector banks have handled a sizable portion of the nation's loans to the education sector. According to a recent R.B.I. study, Public Sector Banks (PSBs) account for 91.42 per cent of all lending to the education sector. In an increasingly privatizing economy like India, private sector banks' extremely low participation in human capital development through education loans is a matter of serious concern. Among the public sector banks, the State Bank of India (S.B.I.) lends the maximum share of education loans both in terms of the number of accounts and amount.

It is interesting to have a look at the trend and pattern of education loans extended by the S.B.I. for the last few years. Tables 3 and 4 examine the contribution of S.B.I. in financing higher education through education loans both in India and abroad. A review of table 5.11 makes it clear that in Kerala and India, the disbursement of education loans by S.B.I. for study in India has been found to fall consistently. The total distribution of education loans in Kerala was ₹.207.73 crores in 2016-17, while it steadily declined to ₹133.82 crores in 2018-19. During the same period, the education loan disbursement fell from ₹2008.42 crores to ₹1609 crores in India. This sharp fall in the distribution of education loan, despite the increasing demand for education loan in a country with a high demographic dividend, need a revisit. The S.B.I., the leader in the disbursement of Education Loan, seems to follow a policy of precaution while granting and disbursing education loans.

Table 3: Sanction and Disbursement of Education Loan by S.B.I. for Study in India

Year	Kerala				India			
	Sanctioned		Disbursed		Sanctioned		Disbursed	
	No. A/cs	Amount (₹Crore)	No. A/cs	Amount (₹Crore)	No. A/cs	Amount (₹Crore)	No. A/cs	Amount (₹Crore)
2016-17	6989	281.42	6767	207.73	49127	2542.28	47616	2008.42
2017-18	4999	219.79	4913	143.64	49360	2756.04	48280	1895.64
2018-19	6608	309.70	6373	133.82	54109	3544.54	52689	1609.08

Source: www.sbi.co.in

Disbursement of education loans for study abroad from S.B.I. showed a positive trend in Kerala. The amount disbursed increased from ₹109.66 crores in 2016-17 to ₹150.79 crores in 2018-19. While in India, the disbursement showed a declining trend. It was ₹1697.71 crore in 2016-17 but fell to ₹.1465.36 crore in 2018-19.

Table 4: Sanction and Disbursement of Education Loan by S.B.I. for Study Abroad

Year	Kerala				India			
	Sanctioned		Disbursed		Sanctioned		Disbursed	
	No. A/cs	Amount (₹Crore)	No. A/cs	Amount (₹Crore)	No. A/cs	Amount (₹Crore)	No. A/cs	Amount (₹Crore)
2016-17	861	151.10	820	109.66	11941	2546.11	11169	1697.71
2017-18	842	183.39	801	112.37	10154	2456.29	9719	1536.13
2018-19	1465	362.39	1383	150.79	13025	3430.85	12439	1465.36

Source: www.sbi.co.in

BORROWERS' AWARENESS ABOUT THE SCHEME OF EDUCATION LOAN

The success of any development programme, including a loan scheme, depends on how far the intended beneficiaries are aware of its rules, regulations and other aspects. Countries like India have many examples of the failure of much-acclaimed schemes. Education loan scheme, being a prominent method of financing the higher education of economically poor but meritorious students, its different dimensions should be clear to its stakeholders. In this background, we have collected information on the level of awareness about various aspects of the education loan scheme among the sample beneficiaries. In all, more than 50 per cent of the sample beneficiaries were fully aware about the rate of interest, rules of interest subsidy and the expenditure

considered for the loan. More than 50 per cent of the borrowers were moderately or partially aware about the aspects like processing charges, security of the loan, margin money, borrowing limit, E.M.I. amount, Loan repayment rules, appraisal, Sanction and disbursement rules and a moratorium period of the loan. It is also interesting to see that more than one-fourth of the borrowers were unaware of the insurance facilities available for education loans.

Similarly, 28.33 per cent of the borrowers were totally unaware about the moratorium rules pertaining to education loans. The scheme prescribes a repayment holiday or moratorium period as the course period plus one year or six months after getting the job, whichever is earlier. Actually, such a moratorium period is incorporated to help the students under the assumption that they cannot earn income during the study period. Even if the instalment is not required to pay, interest shall be charged on the principal amount during the period. So, a clear idea about this clause is essential for the borrowing family, as it will pile up the interest burden when the repayment starts. These are all revealing shreds of evidence of the pitfalls of the much-acclaimed scheme. For calculating the mean score, the options were assigned values as 3 for fully aware, 2 for partially aware and 1 for unaware.

Table 5: Awareness about the various aspects of Education Loan

Sl. No.	Aspects of Loan	Level of Awareness (%) of Sample Beneficiaries			Mean Score
		Fully aware	Partially aware	Unaware	
1	Rate of interest	57.50	38.33	4.17	2.53
2	Processing charges	32.50	56.67	10.83	2.22
3	Security insisted	29.17	61.67	9.17	2.20
4	Margin money	35.00	57.50	7.50	2.23
5	Interest subsidy	57.50	40.00	2.50	2.55
6	Quantum of finance	41.67	50.00	8.33	2.33
7	Insurance	32.50	40.83	26.67	2.06
8	E.M.I. amount	40.00	51.67	8.33	2.32
9	Loan repayment rules	35.00	51.67	13.33	2.22
10	Appraisal, Sanction and disbursement of loan	35.00	50.00	15.00	2.20
11	Moratorium period	20.83	50.83	28.33	1.43
12	Expenses Considered for loan	56.67	38.33	5.00	2.52

Source: Sample Survey

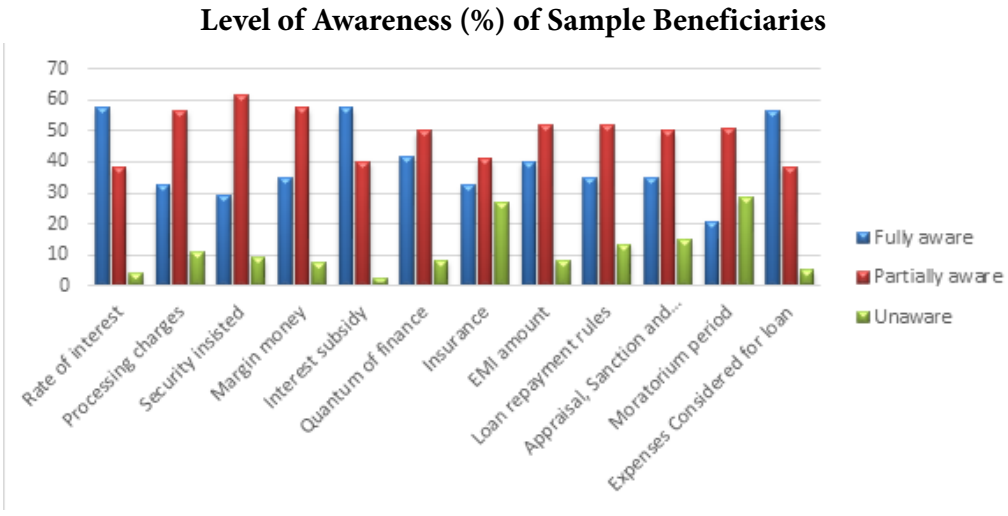

Fig 1: Awareness level of beneficiaries

TIME TAKEN TO GET AN EDUCATION LOAN

In any loan, the time required to get it sanctioned is very important. In the case of education loans, this timely Sanction and disbursal of loans is highly pertinent as the students need to remit their fees on time. We have enquired about the time at which they received their loan. The data in this regard is provided in Table 6. A close look at the table reveals that 94.2 per cent of the total number of respondents could get their education loan within one month, complying with the rule regarding Sanction and disbursement as contained in the Model Education Loan Act, 2001. A discussion with the selected bank managers indicates that if all the documents are in order, sanctioning the loan takes only two weeks.

Table 6: The Time Lag between Loan Application and Loan Disbursement

No. of days	Frequency	Percent	Cumulative Percent
Below 10 days	15	12.5	12.5
10-20 days	59	49.2	61.7
20-30 days	39	32.5	94.2
More than 30 days	7	5.8	100.0
Total	120	100.0	

Source: Sample Survey

SOURCES OF INFORMATION ABOUT THE EDUCATION LOAN SCHEME

The beneficiaries of any scheme receive schematic information from many sources. In this connection, we have enquired about the sources of knowledge about the education loan among the sample borrowers. The data of this information is provided in table 7. The major source is found to be direct contact with bank offices followed by friends, relatives and fellow students. It is sad to note that the role of Radio/Television/ Newspapers and the government /bank websites are not such prominent sources of information about one of the very important loan portfolios for the human capital formation of a developing country like India.

Table 7: Sources of Information about the Education Loan Scheme

Source of Information	Frequency	Percent	Cumulative Percent
Friends and Relatives, Fellow students	34	28.3	28.3
Radio/T.V./Newspaper	15	12.5	40.8
Physically visiting banks	52	43.3	84.2
Govt. websites/bank websites	19	15.8	100.0
Total	120	100.0	

Source: Sample Survey

RECOMMENDATIONS AND CONCLUSIONS

From the findings mentioned earlier, we put forward the following suggestions for streamlining the education loan scheme to contribute to the country's human capital formation and act as an alternative source of financing higher education.

- As India has a well-developed Banking Sector, private and public sector commercial banks should come forward to finance higher education through education loan schemes.
- To ensure a continuous flow of funds from the banking sector to finance higher education, there should be a mandatory share for education loans under priority sector lending guidelines.
- Despite the prospects in the education sector, there hasn't been much increase in the portfolio of student loans. Higher delinquencies banks face, and the lack of specialist lending institutions in this market could be major contributing factors. The decision-makers should seriously consider these restrictions.
- As many bankers felt that it becomes difficult for banks to locate and chase students after the completion of the course and the moratorium period, other mechanisms followed in other

countries should be adopted to trace them.

- The beneficiaries' awareness of the different aspects of the loan was very low. So, the bankers should conduct proper awareness-building training among the applicants before sanctioning the loan.
- It is seen that still, a majority of the borrowers don't feel that an education loan is a fine alternative to finance higher education. It requires fine-tuning the scheme to suit the requirements of the clients.

Therefore, many nations around the world, including India, have adopted student loans as an alternative source or supplementary mechanism of higher education financing because higher education represents an effective private investment, and it was reasonable to expect students and graduates to contribute to the cost of their education by repaying loans after they had graduated from university. The initial framework must be considered when analysing the Model Education Loan Scheme that the Indian Banks Association designed in 2001. Almost two decades have passed since this scheme was floated in our country. So, one has to look at the scheme's effectiveness in realizing the educational dreams of the poor but meritorious students, who have no other option other than loan assistance in an increasingly privatizing higher education economy like ours.

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ISSN: 0973-6190

INTERNET USAGE AMONG COLLEGE STUDENTS IN RELATION TO LOCATION

3

RAMANDEEP KAUR
Ph.D. Research Scholar
Department of Education and Community Service
Punjabi University
Patiala - 147 002

Dr. HARPAL KAUR
Associate Professor
Akal College of Education
Mastuana Sahib, Sangrur
Punjab - 148 001

INTRODUCTION

In this modern scenario, Internet has become an essential part of human life. It plays essential role in every field of life including education. Previously education took place simply through oral lectures, dialogues, reading books, and use of chalks, etc. but in this digital era, technology has brought a sea change in the education system. Students involve more actively in the learning process with the help of technological devices. The use of technology, particularly internet has been very much helpful for both teachers and students in teaching learning process, and provides new orientation to teaching strategies for the teachers, to satisfy the need of each and every student, in pursuit of excellence.

On one side internet provides more affirmative impacts on learners' lives but on contrary it can get through some users particularly students, to the point that interferes with normal living, enforcing them into compulsive internet use. For that reason, it becomes important for us to be aware of the impact of internet usage on students' behaviour. In addition, the importance of information and communications technology (ICT) is even higher in the present crisis than usual. ICT has been imperative in allowing large groups of people to work and study from home, enhancing social connectedness, providing greatly needed entertainment, etc. (Kiraly et al. 2020). Technological development allied with the sheer creativity of tech-savvy teachers and entrepreneurs, it is definite that technology will impact education in multiple ways involving artificial intelligence, machine leaning, block chains, handheld computing devices, adaptive computer testing for student development, and other forms of educational software and hardware (National Education Policy 2020).

REVIEW OF RELATED LITERATURE

Loan (2011) conducted a comparative study on internet use by rural and urban college. It was found that significant difference existed between urban and rural college students in internet usage. The greater part of urban college students used internet mainly for information while rural college students mainly used internet for education purpose. Serin (2011) found that gender significant difference existed between male and female students in relation to internet addiction. Male students were more addicted to internet as compared to their female students. Hu et al., (2012) stated that gender differences were found in internet usage as male college students had a higher level of perceptions of internet self-efficacy, experience, and information overload than females. Dhull and Sangeeta, (2015) found that tere was no significance difference between high alienation and low alienation in relation to internet usage among senior secondary school students. Male students were more addicted to internet for making new friendships and getting into relationships online, and having permanently logged-in status increased risk for internet addiction as compared to female students, while using the internet more for assignments was favored as a protective factor for addiction (Krishnamurthy & Chetlapalli, 2015). Most students access internet in their college time; there is a positive attitude towards Internet; and they used internet mainly for social websites, chatting and information gathering (Tamara et al., 2016). Male high school students and female high school students did not differ in relation to problematic internet use and no differences were found in psychological wellbeing in relation to "Average internet users" and "Risk internet users" among high school students (Pal, 2017). Bodhi (2018) stated that internet usage was positively and significantly related with depression, anxiety and stress among university students while internet usage had no significant correlation with self-efficacy. Sowndarya and Patttar (2018) found that significant difference existed in internet addiction among school student. The urban school students found to be more addicted to internet as compared to rural school students.

OBJECTIVES

- To study the internet usage among college students.
- To study the significant difference in the internet usage in relation to location among college students.

HYPOTHESIS

- There is no significant difference in the internet usage in relation to location among college students.

METHODOLOGY

Descriptive survey method of research was used in the present study which explored the internet usage in relation to location among college students. A sample consisted of 297 undergraduate students (167 rural college

students and 130 urban college students) selected from government colleges affiliated to Punjabi University, Patiala by using random sampling technique. The researchers made Internet Usage Scale was used to collect the data. Cronbach Alfa and split half method of reliability were used to establish the reliability of the scale and the correlation values found to be 0.92 and 0.86 respectively. The final form of the tool consisted of 35 items with 3 dimensions (educational purpose, social purpose and personal purpose). In order to analyse the data mean, standard deviation and t-test were applied.

ANALYSIS AND INTERPRETATION OF DATA

Table 1: Dimension wise Mean and SD Scores of Internet Usage among College Students

Sl. No.	Dimensions	Rural N= (167)		Urban N= (130)		MD	SEd	t value
		Mean	SD	Mean	SD			
1.	Educational Purpose	49.60	7.00	51.88	7.97	2.28	0.87	2.62**
2.	Social Purpose	29.53	6.02	29.62	5.76	0.69	0.09	0.13
3.	Personal Purpose	30.14	6.18	30.32	5.53	0.18	0.69	0.26
4.	Total IU	109.28	14.02	111.82	15.30	2.54	1.70	1.48

**P<0.01

Table 1 revealed that the mean and SD values of internet usage of rural college students are 49.60 and 7.00 and urban college student are 51.88 and 7.97 for educational purposes. This indicated that urban college students used more internet than the rural college students for their educational purposes (49.60<51.88). The mean difference between the internet usage between rural and urban college students for educational purposes is 2.28 and t value of significance difference of internet usage of rural and urban college students is 2.62, which is significant at 0.01 level of significance. Thus it can be stated that there is significant difference existed between the mean scores of internet usage of rural and urban college students for educational purposes.

As far as social purpose of internet usage is concerned, urban college students have high mean score than the rural college students (29.62>29.53) but the t-value for internet usage of social purposes of rural and urban college students is 0.13 which is not significant. This indicated that there is no significant difference between internet usage for social purposes between the rural and urban college students.

The mean and SD of internet usage for personal purpose of rural college students are 30.14 and 6.18 whereas the

mean and SD of urban college students for internet usage are 30.32 and 5.53. The difference between the internet usage among rural and urban college students for personal purposes is 0.18 and t value of significance difference of internet usage of rural and urban college students is 0.26, which is not significant. Thus it can be concluded that there is no significant difference between the internet usage of rural and urban college students for personal purposes.

As far as total internet usage scores are concerned, urban college students have high mean score than the rural college students (111.82>109.28). The t-value for total internet usage scores is 1.48 which is not significant. This indicates that there is no significant difference between internet usage among rural and urban college students.

Hence it is observed from the table that there is no significant difference in overall internet usage and internet usage for social purposes and personal purposes among rural college students and urban college students. Whereas, there is significant difference existed in internet usage among rural college students and urban college students for educational purposes. Thus the hypothesis stating, there exists no significant difference in the internet usage in relation to location among college students is accepted in relation with social purposes and personal purposes whereas not accepted in relation with educational purposes.

EDUCATIONAL IMPLICATIONS

This is an area for future research, and in order to provide better service from related ICT industries, it is suggested that the following categories could be examined: education, health care, entertainment, job hunting, weather and news, financial information and personal use. Internet helps students to make learning process more interesting by making learning more engaging and collaborative. Hence, according to the need of time, college, parents and teachers have to make use of technology in their teaching so that teachers and students can have more understanding of the content and up to date their knowledge. Apart from this, parents should make it sure that their children use internet wisely. They should involve their children to household chores and outdoor games in their free time to escape them from negative effects of internet usage.

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ISSN: 0973-6190

EFFECT OF CONCEPT MAPPING STRATEGY ON ACHIEVEMENT IN BOTANY AMONG XI STANDARD STUDENTS: A GENDER ANALYSIS

4

S. GANDHI
Research Scholar
Department of Education
Periyar University
Salem, Tamil Nadu – 636 011

Dr. G. HEMA
Assistant Professor
Department of Education
Periyar University
Salem, Tamil Nadu – 636 011

INTRODUCTION

Concept mapping are thinking through and visually representing between thoughts from mental connections that allow for better retention of knowledge. The focus of concept mapping strategy is therefore specific that they're supposed to be enforced to reinforce the recall of the elements of any lesson that memory is required. It is now used as a medium to represent and assess changes in student's understanding of science (Novak & Canas, 2008). These concept mapping strategies are enforced to assist students recall new and unknown information. Concept maps have their basis in the constructivism educational philosophy, which asserts that students actively construct knowledge. David Ausubel's cognitive theories (assimilation theory), which emphasised the value of existing knowledge in the process of learning new concepts, served as the foundation for Novak's research (Villalon & Calvo, 2011). Concepts usually represented as boxes or circles are connected with labeled arrows in a downward branching hierarchical structure. The relationship concepts can be expressed in linking phrases such as "gives rise to," "results in, or "contributes to" (Moon et al., 2011). Therefore, the technique for visualizing these relationships among different concepts is called mapping. Concept mapping can provide as a helpful tool in the education field and helping the students to understand concepts more easily, link prior new knowledge and represent their thoughtful of those concepts. It is initiated to be an effective teaching strategy that enhances achievement among students (Gandhi & Hema, 2019).

REVIEW OF RELATED STUDIES

Concept maps are described as two or three dimensional graphic representations of interactions between conceptual pairings utilising labelled nodes (Bamidele et al. 2013). Concept maps are viewed by as a two-dimensional hierarchical diagram that shows the links between and among various concepts

(Aderogba, 2006). Concept maps offer a visual road map illustrating some of the pathways in propositions, where concepts are regularities in occurrences or things denoted by some labels. Propositions are two or more ideas labels linked by words in a semantic unit. Concept maps could be used in any subject at any level (Frisendal, 2012). Concept mapping had a substantial impact on writing ability (Ahangari & Behzady, 2011). The concept mapping approach of writing demonstrates that the experimental group outperformed the control group and had higher composition scores in the Korean language (Fahim & Rahimi, 2011; Lee, 2013). Concept mapping technique for teaching and learning, whether used with individual students or in cooperative learning groups (Bilesanmi, 2002; & Rekha, 2010). Concept mapping for meaningful learning, and empirical evidence suggests that concept mapping can be used to improve student learning outcomes in general and scientific outcomes in particular (Gerstner & Banger, 2012).

Concept mapping teaching strategies had a significant impact on performance, with students exposed to concept maps performing significantly better than their peers taught with conventional teaching strategies (Okoronka,2018). Significant difference in the performance of students who taught physics using the concept map learning strategy and those who taught using the explanatory method, in favor of the concept map group Meheux (2017). The students exposed to the teaching strategy of concept mapping performed significantly better than their peers exposed to the conventional teaching strategy Ogonnaya et al. (2016). Concept mapping as a learning tool improves student academic performance by enabling active participation in learning, discussion, sharing of concepts, and resolution of misunderstandings (Cheema & Mirza, 2013). Students exposed to concept maps also performed better than their peers exposed to conventional teaching methods (Nnamdi & Okechukwu, 2006).

Concept mapping approach recorded considerably better retentive mean ratings than those who had been taught using the traditional method. Studies on the influence of gender on the instructional fulfillment and improve of college students has been inconclusive over the years (Awodun, 2017). Effectiveness of thought maps on college student's fulfillment and retention in electricity whilst in comparison with the traditional teaching method (Bawaneh, 2019). Concept maps achieved considerably better and had a better mean retentions core than their counterparts taught using traditional method (Adeniran, Ochu, & Aatoo,2018). Concept mapping strategy was an effective teaching strategy that enhances for the students' achievement (Sivakumar,2022). The difference between pretest and posttest of academic achievement of girl students and boy students in physics in control and experimental group (Sukanya & Shailaja, 2017). Both male and female students

performed better in biology when concept maps instructional strategy was used, David & Michael (2021). Ahmed, Shittu & Yahaya (2021) revealed that male and female students benefitted almost equally when the concept mapping instructional strategy was used for teaching biology.

SIGNIFICANCE OF THE STUDY

Achieving gender equality in education means an equal opportunity for both males and females to have equal learning process, equal learning outcome. Men and women are equal in the world for all, but they differ in physical and mental nature. Although the teaching methods are the same for both sexes, the learning abilities of the students are not the same. The influence of gender and differences in instructional performance is a complex task. The way both are taught in the classroom is the same and the way they demonstrate their understanding of the concepts through exams is different. Therefore, the gender variable was chosen for the research to find out the difference between both male and female students in learning and expressing their mastery.

OBJECTIVES

- To find out the significant difference between pre test scores of experimental group and control group in Botany based on their gender.
- To find out the significant difference between post test scores of experimental group and control group in Botany based on their gender

HYPOTHESES

1. There is no significant difference between pre test scores of experimental group and control group in Botany based on their gender.
2. There is no significant difference between post test scores of experimental group and control group in Botany based on their gender.

METHODOLOGY

The study was carried out to investigate the effect of learning through concept mapping on achievement in Botany among higher secondary school students in Salem district of Tamil Nadu. Quasi-experimental design has been followed in this study. Purposive sampling method has been used for selecting the sample. Two intact sections from class XI were selected for conducting the experiment. One section of thirty students was treated as experimental group and the other section of same thirty students was treated as control group. The Biology Achievement Test (BAT) and concept mapping strategic package for Botany developed by the researcher was used in the intervention programme for 30 days of instruction. The pre-test tool was used for data collection and the statements of the tool re-arranged for post-test and administered. The treatment lasted for 6 weeks for the experimental group that was taught by the researcher using

concept map strategy while the Botany teacher taught the control group for the period of 6 weeks by using conventional teaching method. Both groups were exposed to BAT in the seventh week. The collected data were analysed using appropriate statistical techniques.

DATA ANALYSIS AND INTERPRETATION

Hypothesis 1: There is no significant difference between pre test scores of experimental group and control group in Botany based on their gender.

Table 1 : Mean Score Difference in Pre Test between Experimental Group and Control Group Based on their Gender

Gender	Group	Sample	Mean	SD	t value
Boys	Experimental	15	8.4	1.18	0.97 NS
	Control	15	7.93	1.43	
Girls	Experimental	15	8.0	1.85	0.69 NS
	Control	15	7.53	1.80	
Overall	Experimental	30	8.2	1.54	1.14 NS
	Control	30	7.73	1.62	

NS = Not significant at 0.05 level

The table 1 showed that the calculated t values 0.97 (Boys), 0.69 (Girls) and 1.14 (overall) are less than the tabulated value 1.96 at 0.05 level significance based on their gender. It stated that there is no significant difference between pre test scores of experimental group and control group in Botany based on their gender. Hence the null hypothesis is accepted.

Hypothesis 2 : There is no significant difference between post test scores of experimental group and control group in Botany based on their gender.

Table 2: Mean Score Difference in Post Test between Experimental Group and Control Group Based on their Gender

Gender	Group	Sample	Mean	SD	t value
Boys	Experimental	15	38.13	3.18	6.6 *
	Control	15	29.73	3.73	
Girls	Experimental	15	38.8	2.45	7.9 *
	Control	15	30.73	3.06	
Overall	Experimental	30	38.4	2.81	10.23 *
	Control	30	30.2	3.37	

* = Significant at 0.05 level

The table 2 showed that the calculated t values 6.6 (Boys), 7.9 (Girls) and 10.23 (overall) are greater than the tabulated value 1.96 at 0.05 level significance based on their gender. It stated that there is a significant difference between post test scores of experimental group and control group in Botany based on their gender. Hence the null hypothesis is not accepted. The mean score difference showed that experimental group had higher mean score than control group.

FINDINGS AND DISCUSSION

The findings of the study are as follows.

- There is no significant difference between pre test scores of boys in experimental group and control group in their achievement in Botany.
- There is no significant difference between pre test scores of girls in experimental group and control group in their achievement in Botany.
- There is a significant difference between post test scores of boys in experimental group and control group in their achievement in Botany.
- There is a significant difference between post test scores of girls in experimental group and control group in their achievement in Botany.
- Overall it is found that the experimental group had higher mean score than control group in post-test. It stated that the intervention programme using concept mapping strategy in teaching botany had significant positive effect on achievement than traditional method of teaching.

The findings of the present study supported the results of the previous studies conducted. Muni and Misra (2021) revealed that the students in class IX taught using concept mapping strategy had high score compared to students taught by traditional method of teaching Science. Mulkha Adebisi Ahmed,et.al (2021) found that the male and female students benefited almost equally when the concept mapping instructional strategy was used for teaching Biology.

CONCLUSION

From the findings of the study, it is concluded that application of concept mapping strategy in teaching Botany is more effective than traditional method of teaching. It assisted to improve the students' achievement score in Botany on the one hand and enhanced their critical and creative thinking abilities on the other hand. Hence, it is recommended that teachers may apply concept mapping and other innovative teaching strategies in teaching learning process that best suits to the concerned subjects.

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ISSN: 0973-6190

REFLECTIVE PRACTICES IN TEACHER EDUCATION FOR CONTINUOUS PROFESSIONAL DEVELOPMENT

5

Dr. SEEMA YADAV
Assistant Professor
Department of Education
The Bhopal School of Social Sciences
Bhopal, Madhya Pradesh - 462 024

INTRODUCTION

In educational research and practice, particularly in many course descriptions for pre-service teacher education, the phrases "reflection" and "reflective practice" are widely used (Elliott-Johns, 2014). In today's teacher education, many courses include the notions of reflection and reflective practice. Many teacher education programmes have incorporated techniques to compel future educators to reflect on their profession in the name of reflection (Pedro, 2005). (Lam, 2015) came to the conclusion that the preparation of teachers must fundamentally incorporate critical pedagogical approaches and liberatory modes of thinking and knowing. The methods used to teach reflection to pre-service teachers highlights issues regarding creative writing techniques used in reflection and is instructive for teacher educators who train pre-service teachers to be reflective practitioners (Pedro, 2005). Multitude of perspectives add authenticity to the learning activities and reduce the chance that students would avoid the pedagogical, moral, emotional, and intellectual obstacles that come with reflection and critical consciousness (Gay & Kirkland, 2010).

By raising their self-awareness in regard to Indigenous content in teacher education courses, a self-reflection-focused approach has the potential to improve teacher candidates' capacity to appreciate and engage with information and viewpoints that differ from their own (Oskineegish, 2019). The fight for social justice via education and teacher preparation needs to be founded on a genuine dedication to the human spirit, to the strength of human agency, and to a professionalism in teaching and research based on those principles (Livingston, 2020). Reflection is a key component of numerous teacher education programmes all around the world. Reflection is still more of a promise in teacher education than it is in practice (Clara, Mauri, Colomina, & Onrubia, 2019). A lot

of emphasis is placed on reflecting on technical issues in teaching in today's standards-driven, teacher education methods. Teachers who are already in the classroom may be better equipped to comprehend and handle the intricacies of classroom and school life with greater wisdom and clarity as a consequence of teacher reflection.

REFLECTION IN TEACHER EDUCATION

Education has given much emphasis to the idea of reflection, although the research on this subject is frequently condensed to just reflective practice (Mortari, 2012). One reform initiative that has gained traction in the education sector is reflective practice in teacher education (Pedro, 2005). Teachers' professional practice can be developed and improved through self-reflection, which is widely acknowledged as a good technique (Oskineegish, 2019). Programs for teacher preparation now include reflection as a standard element (Beauchamp, 2015). Reflection in teacher education highlights the on-going difficulty in fostering reflective activity that yields useful outcomes in a professional setting (Beauchamp, 2015). Educating teachers who can apply theory to practice and critically evaluate their experiences and behaviours has become a goal of many teacher education programmes that have embraced a reflective approach (Dewey, 1933). The professional teacher's practice must include critical reflection (Berglund, Gustavsson, & Andersson, 2020).

Reflection has become accepted as an integral part of the preparation of teachers in university contexts, both in terms of the theoretical back- ground necessary for understanding teaching and the practical approaches to class-room action (Beauchamp, 2015). (Gay & Kirkland, 2010) contends that a key element of pre-service teacher preparation should be the development of personal and professional critical consciousness of racial, cultural, and ethnic diversity (Gay & Kirkland, 2010). In both pre-service teacher education and in-service staff development, critical racial and cultural consciousness ought to be combined with self-reflection. The main focus of teacher reflection and professional development is on developing technical skills in the areas of instruction, management of the classroom, assessment, and professional duties (Klein, 2008). The reflective framework incorporates concepts from social constructivist, sociocultural, and contextual approaches of learning, emphasising the interdependence of individual and social learning processes as well as environments for learning that are socially and culturally created (Körkkö, Kyrö-Ämmälä, & Turunen, 2016).

Being a reflective teacher requires one to be willing and able to examine, frame, and attempt to resolve the dilemmas of classroom practice. It also requires one to be aware of and question the assumptions and values that one brings to teaching. It also requires one to pay attention to the institutional and cultural contexts

in which he or she teaches. Finally, it requires one to take ownership of one's own professional development (Zeichner, 2008). There is widespread agreement that encouraging introspection and reflective practice is important in teacher education programmes (Mulryan-Kyne, 2020). Reflection plays a crucial role in assisting the application of theory to practice, there is a need to address this bridging of the gap between college work and school experience as well as reflection in the context of college work and school experience in the future (Mulryan-Kyne, 2020). Teachers routinely evaluate their actions in an effort to behave better in the future. Conscious and methodical learning from events is a trait of strong workers (Korthagen, 2014).

REFLECTION IN TEACHER EDUCATION AND ITS RELEVANT CHALLENGES

The obstacles involved in teaching about reflection and fostering its development are regularly mentioned in a variety of educational publications, but the idea of reflection and the application of it in teaching contexts continue to elicit criticism and caution from a variety of sources (Beauchamp, 2015). Action-oriented reflection rarely advances professional development in the long run compared to meaning-oriented contemplation (Korthagen, 2014). There aren't many high-quality opportunities for supervised practice in self-reflection available to students in teacher education (Gay & Kirkland, 2010). There are other more deliberate strategies that prevent pre-service teachers from developing self-reflection and critical consciousness skills (Gay & Kirkland, 2010). The activities involving self-reflection had a generally beneficial effect on teacher candidates, and the practice of self-reflection may have an effect on teacher candidates in teacher training programmes (Oskineegish, 2019). Reflection among teachers is frequently limited to the surface (Korthagen, 2014).

SOLVING THE CHALLENGES OF RELEVANT CHALLENGES OF REFLECTION IN TEACHER EDUCATION

Instructors in pre-service programmes should address the issues by utilising inquiry teaching strategies and assisting students in forming the habit, abilities, and spirit of criticalness as habitual components of their learning experiences. These learning strategies will provide a foundation and a model for teacher candidates to apply in their own classrooms if they are fostered and modelled throughout the general teacher education curriculum. The educational options and results for pupils must be improved, and this requires self-reflection and cultural critical consciousness (Gay & Kirkland, 2010). It can be difficult for teacher education students to cultivate a sense of self-reflection and cultural critical consciousness, but it is possible (Gay & Kirkland, 2010). He discusses both the problematic aspects of the teacher education discussion as well as the problems with teacher education (Akiroglu & Akiroglu, 2003). Given

the critical role that reflection plays in assisting the application of theory to practice, it is imperative that this closing of the gap between college work and school experience, as well as reflection in the context of college work and school experience, be addressed moving forward (Mulryan-Kyne, 2020). Tasks that emphasise both introspection and linking the settings of knowledge and practise based on research and experience must be included in critical reflection (Berglund et al., 2020). Teachers must carefully consider their emotional and motivational dimensions as well as their self-identity in order to derive a deeper meaning from their experiences (Korkko, 2019). In order for pre-service and in-service teacher education to be able to support one another in the effort to reclaim the classroom, it is necessary to move in the direction that is mutually reinforcing. This is accomplished by adopting the more expansive and politically informed type of reflective pose that is advocated in this paper (Smyth, 1989). Tasks for critical reflection should concentrate on both reflection and linking the settings of practice and research-based knowledge (Berglund et al., 2020).

CONCLUSION

The way teacher education is currently conducted is standard-driven and heavily emphasises reflection on technical teaching issues. In order to integrate school and society through comprehending the social, historical, and political contexts of education, critical pedagogical approaches must play an important part in teacher preparation programmes. Our efforts in teacher preparation must be centred on critical pedagogical approaches. There is a need for a paradigm shift in the way we prepare teachers and see the teaching and learning process. With teacher educators devoted to the creation of reflective practitioners, there are valuable insights to be shared. Reflective teachers may be better equipped to comprehend and negotiate the intricacies of the classroom and school life with more knowledge and clarity. A great dedication to the human spirit, the strength of human agency, and a fundamental commitment to a professionalism in teaching and research that is founded on those principles must serve as the foundation for the fight for social justice in and through education and teacher education.

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