

Thematic Analysis of Paper Setter's and Marking Staff's Understanding about Examination Questions Writing at SSC level in Pakistan

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ABSTRACT

This research focuses on thematic understanding of paper setting and marking staff for examination questions writing, paper setting and answer book marking process. All these persons are related to secondary school certificate examination. The objective of this work is to know their cognitive competency level and their previous knowledge about paper setting experience. Paper setting and question paper writing staff and marking process persons are key persons for assessment system. To achieve the objectives of research, a group of 20 paper setters and marking staff were interviewed. As per received data of interviews, 12 theme areas were identified. To get detailed results from this data, thematic analysis technique was used. This technique has proven to be wonderful approach for more deliberation of interview data. Various areas were identified, including previous background of paper setters, their knowledge about cognitive competency of questions, their involvement in paper setting process and knowledge about process of questions preparation. As per obtained results of thematic analysis, N-Vivo analysis tool was applied for better understanding of results.

Secondary education boards in Pakistan are providing trainings to paper setters on questions preparation and also give them guidelines for paper setting and marking process. These training processes were reviewed. Practices of answer sheets marking also elucidate the role of education boards to accomplish this task. Resultantly gaps in all processes were identified, suggestions / comments of paper setters and marking staff were also recorded as reference for future research work.

INTRUCTION

Thematic analysis procedure of research was originally developed for psychological research by (Clarke & Braun, 2016). However, it is a flexible method and adopted mostly in various qualitative researches. (Squires, 2023) describe It as a method of analyzing qualitative data in a data set and also involves the searching for recurring ideas (referred to as themes) in a data set or some collected information. It is an ideal approach to know people's opinion, experiences, knowledge from data collected in form of interviews, surveys and transcripts etc. (Braun, Clarke, & Rance, 2015) used this technique as proven to be very effective to obtain desired results from theme areas. Based on types of questions of interviews core ideas are collected and compiled under one theme,(Braun et al., 2015). The application of thematic analysis requires trained expertise and should not be used in a prescriptive, linear, and inflexible manner while analyzing data. It should rather be implemented in relation to research question and data availability(Majumdar, 2022).

The Secondary School Certificate examination is usually conducted in March every year in Pakistan. All education boards start their examination preparation approximately 3- 4 months before the examination commencement. Paper setters are selected and trained, question papers are prepared, examination centers are identified, and students are allocated in these centers, invigilation staff are hired and trained. The paper-setting process starts usually with meetings of the Committee of Courses. According to (Khattak, 2012) the Board of Intermediate and Secondary Education (BISE) Act, 1976, the Committee of Courses in each subject is composed of four senior teachers/subject experts. The Committee recommends a list of potential paper setters in relevant subjects. The minimal requirement for a paper-setter entails having the necessary qualifications, with preferably ten years of teaching experience at the school level and having taught the subject at the secondary level within the past two years. In paper settings at secondary and higher secondary levels, mostly subject specialists, and senior teachers of education institutions within the jurisdiction of the board are called through advertisement on the BISE website or through local peer contacts. It is opinioned by (Sreekanth, 2007) that effective questions are clear, purposeful, brief, naturally sequenced, and thought-provoking. It also proved by research that inherent weaknesses in the public examination are beyond the control of students, but the paper setters and evaluators can improve its structure.

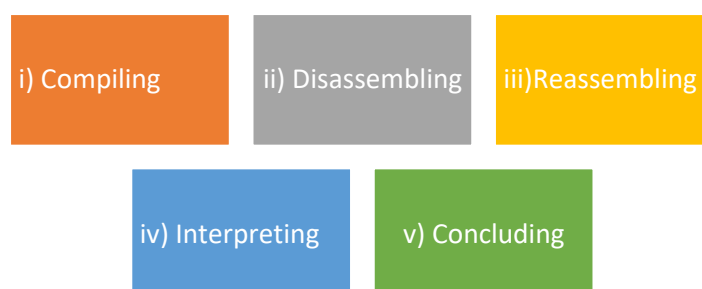
For the paper setter, the teacher should have remained part of the paper invigilation and marking process so that he/she must have an idea about the requirements of the examination system. (Sreekanth, 2007) elaborated that that once the paper is set and the examination is conducted, subject specialists are involved in the preparation of the answer key. They prepare clues of answers based on their teaching experience and textbook knowledge. These keys are later provided to paper marking staff along with answer books to evaluate the answers of the students. (Elliott & Elliott, 2011) explains this phenomenon as the examiner can evaluate the manuscripts based on his knowledge and in consideration of the answer key, They have to work under strict time constraints, and must consider various sources, from script to mark-scheme to exemplar marked scripts.

It is a proven fact that cognitive ability is the most important indicator of academic achievement in many subjects (Taub, Azevedo, Bradbury, & Mudrick, 2020). It can also be rectified by developing a pool of items having multiple choice questions and extended response questions (Uddin, Parvez, Mullick, & Habib, 2022). (Vernez, Culbertson, Constant, & Karam, 2016) highlighted that Iraqi Kurdistan curriculum has focused largely on promoting students' higher order skills by including different higher cognitive skills-based activities. It is evident from a study by (Wara, Aloka, & Odongo, 2018) that in the classroom, students are engaged in critical thinking and analyze ideas in depth, and teachers also stressed the importance of studying hard. Utilizing the curriculum for in-service professional development for teachers can be an effective means of enriching high order thinking skills (HOTS). This approach helps teachers impart a more profound comprehension of scientific concepts and their practical application in everyday life (Singh, Singh, Tunku, Mostafa, & Singh, 2018) . Studies on cognitive skills indicate that facilitating higher-order thinking skills in the learning process helps students gain an awareness of their thinking and improves their learning and performance. The learning outcomes were crafted using suitable action verbs, aligning with Bloom's six cognitive domains. This approach involved analyzing both low-order thinking skills and high order thinking skills (Ahmad, Anwar, Ullahkhan, Idris, & Al Ameen, 2014). (Zohar, 1999) used concept of thematic analysis for teachers metacognitive understanding about teaching system. The main finding is that teachers' intuitive (i.e., pre-instructional) knowledge of metacognition of thinking skills is unsatisfactory for the purpose of teaching higher order thinking in science classrooms. These concepts are further evoked by study of (Terry, Hayfield, Clarke, & Braun, 2017) that how to use thematic analysis technique with more flexibility. In another wonderful research work done by (Riger & Sigurvinsdottir, 2016)

applied open ended inductive style for interview of various victims and analyse these by application of thematic analysis technique. It enabled them to identify ideas common across the interview.

RESEARCH METHODOLOGY

For present study, experts were invited from existing pool of paper setters and marking staff of various education boards invited at Bahawalpur board. Their previous experience and competence in the paper-setting process assessed through semi-structured interviews with a selected group of paper setters. That questionnaire comprising 16 questions of diverse nature was used to gather data from experts involved in the paper setting and marking process. The responses obtained from the questionnaire organized and tabulated based on specific parameters using the thematic analysis method. Thematic analysis has proven to be an excellent technique for analyzing interviews. From the questionnaire, 12 thematic areas were identified, and data relevant to these themes were extracted from the interviews. The analysis was conducted on qualitative basis. Main steps of Thematic Analysis are based on a model of qualitative data analysis and can be outlined in following five steps:



For present research, 20 paper setters from various secondary education boards were interviewed and their responses were analysed based on thematic analysis technique. Following are 12(twelve) theme areas extracted from interview questions of paper setters

Either it is tricky part of research to extract one focused results from above mentioned themes but researcher tried to be nonjudgmental and just summarized teachers' opinion and narrated as one focused answer. Thematic analysis provides a lot of flexibility in interpreting data conceived from interviews and also allows to sort it out into broader themes(Terry et al., 2017). It reflects the subjectivity aspect of data due to judgments of researchers and needs very careful interpretations of themes(Joffe, 2011). The following theme areas are defined to get

information about paper setters' cognitive knowledge about paper setting and marking system and comparison of their thoughts with each other. (Yusri, Muspardi, Kemal, & Rahmat, 2019) referred Indonesian qualification framework with the application of Bloom's revised taxonomy to describe the assessment of learning outcomes on cognitive aspects.

Tools for Data Collection:

A semi structured questionnaire was used to collect data from interviewees, this is administered side by side to one-to-one interview. Its objective is to validate data collected from both sources.

Table 1: Theme Areas of Responses

Sr.No	Title of Theme Areas
1	Biography
2	Frequency of Paper Setting
3	Selection Process
4	Reasons for Selection
5	Instruction from Boards
6	Pairing Mechanism
7	Distribution of Scheme of Study
8	Selection of Syllabus topics
9	Knowledge about Learning Outcomes
10	Assessment and Decision about Difficulty Level
11	Weakness of the System
12	Improvement Process.

NVivo analysis technique was used to get more elaborate results from all 12 themes. It is used because in recent years qualitative methods of research are getting popularity to explore the perspective and meaning of experiences, seek insight and identify the social structures or processes that explain people's behavioral meaning (Wong, 2008) and NVivo is proven to be easiest tool to get better results.

Results and Discussion

Results from 12 theme areas were enlisted in a table and for more detailed elaborations N-Vivo technique was applied, This Technique is proved to be a powerful tool for researchers engaged in qualitative data analysis and providing a structured platform for organizing, analyzing, and interpreting qualitative data efficiently. Results of thematic analysis were further deliberated by using NVivo software to get more detailed deliberations of answers obtained through interviews of paper setters and marking staff. This table gives a glimpse of 12 theme areas extracted through interview of paper setters. As per output received from participants the details of results of all areas are as follows:

Interpretation of Results of Theme Areas

Theme 01: Biography Most of the teachers are from government schools and their qualification ranges from **MSc to PhD level** and age ranges from **33 to 55** years it reflects junior level as well as very senior level teachers are part of paper setting process. If we compare paper setting process of our system with globally using systems of question paper setters' selection we can use example of Cambridge system of education, in this system expression of interest (EOI) floated through all print media sources for inviting applications of suitable incumbents to apply for paper setting process. Applications received and evaluated by senior team members for the selection of suitable fellows for this process. This including condition of suitable expertise of relevant subject experts. By using this reference of paper setting system

of other education systems of the world it was analyzed that there is no existence of systematic process of paper setter's selection therefore it is completely a personal criteria of board authorities.

Theme 02: Frequency of being paper setter the responses of paper setters shows, that most paper setters have been inducted very frequently and chances of inducting new paper setters seems very low.

Theme 03: Process for selection interpretations showed that most of the teachers worked as sub examiner and head examiner with secondary education boards and only two were involved as fresh entry into system.

Theme 04: Reason for selection

It is reported that most of the teachers remained examiners and head examiners in boards except two entries in the system. Education board did not call for paper setters every time rather previously involved stereotype team members called again and again

Theme 05: Instructions from education boards

A combine orientation session of all boards organized at a single location of boards, but its main focus is about paper pattern and distribution of marks and no training material given about structure of questions and design of objective and subjective type questions.

Theme 06: Pairing mechanism

Education boards have provided a set of guidelines about pairing and coordinator explained these to all instructions. These included information about sequence of chapters for writing of questions without considering the difficulty level of concepts covered in these chapters.

Theme 07: Distribution of scheme of study

Education boards has provided outline for the scheme of study and paper setters followed it, coordinators restricted them to follow it while some paper setters reported during interview that they have chosen some other important questions as per their class room teaching experience.

Theme 08: Selection of syllabus topics

Complete syllabus of biology advised to follow, they kept in consideration no specific topics and prepared questions from random topics while some of them used their own experience in question preparation rather than outline of complete syllabus.

Theme 09: Knowledge about learning outcomes

These terms were discussed in training of paper setters but have not applied in paper setting process. Paper setters did not have idea about importance and consideration of learning outcomes.

Theme 10 : Assessment and decision about difficulty level

Questions needs to be moderate in nature and at least 20 percent should be application level and also conceptual level questions needs to include

Theme 11: Weakness of system

Paper setting system is based on stereo type questions and did not permit any new concepts it is just repetition of concept and also marking system is very poor structured and needs a lot improvements from boards authorities.

Theme 12: Proposed Improvements

Selection of paper setters and paper marking staff should be on open merit and customized trainings are required. For paper marking there is aggressive improvement required in key preparation because paper marking staff only followed this. It was proposed by them that a certified paper setters development system needs to introduce for balanced and standard questions preparation for MCQ extended response questions. Extensive questions data should be prepared keeping the distribution of marks in mind.

Conclusion Extracted from Thematic Analysis

The results based on above 12 theme areas can be concluded that: Mostly teachers from government schools invited by secondary boards as experts for paper setting, these are the incumbents remained part of teaching system since long and have good expertise on teaching of that level or to mark papers of similar level. They were provided training on setting paper but no emphasis on cognitive skills evaluation of students even though were not have freedom to introduce some new topics or different design of question items this is the reason same kind of stereotype questions were found in study and not considerable change is observed in last five year question papers. For pairing scheme of chapters, board restricted them to follow a predesigned pattern and have no choice in it. When these selected paper setters got a customized training by senior level experts of education sector and they got aware of the fact that cognitive demands of curriculum are very focused to inculcate some specific level of cognitive skills in students and these are totally ignored by text book developers and also by boards to prepare that specific level items to evaluate cognitive competency of students. This is very alarming situation by system that we all consider curriculum a master document of education system but keep ignoring the directions of curriculum at every level of this system.

For more detailed elaborations of results **N-Vivo** qualitative data analysis technique used and word frequency analysis method applied, following are the details of it.

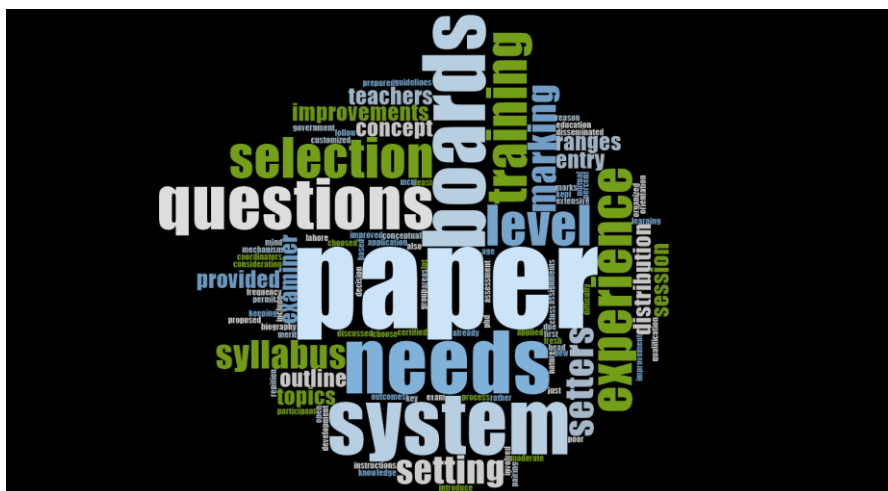


Fig 01(a): NVivo word cloud analysis of all 12 theme areas

paper	system	selection	setting	examine	teache	areas	class	discus	disse	due	educa	exam	extens	first
				improver	topics	asses	conce	follow	impro	impro	includ	instru	introd	involv
	questions	training	syllabus	outline		assign	consid	freque	just	learn	least	lot	marks	mcq
boards			concept	provided	age	based	coord	fresh	keepin	mech	nature	new	open	organ
	experience	marking		already		biograc	custo	gover	kept	merit	orient	perce	perm	phd
needs			distributi	ranges	also	certifi	decisi	group	key	mind	outcor	poor	prop	qualit
	level	setters	entry	session	applic	choos	devel	guide	knowl	mode	pairing	prepar	rather	rep
					applic	choos	difficu	head	lahore	mutua	partici	proces	reason	

Fig 01(b): NVivo Frequency Tree of 12 theme areas

Interpretation of Results obtained from NVivo (Fig 01 & Frequency Tree)

Figure 01 and frequency tree of 12 theme areas depicts, that paper setting system of boards have no proper mechanisms for selection and training of paper setters. Being paper setters distribution of syllabus selection of was random and guideline provided on it. Outline to prepare question paper was not given and they selected topics as per their own experience. Learning outcomes of curriculum was not reviewed and also not considered in question paper preparation. Need of more customized orientation sessions is highlighted.

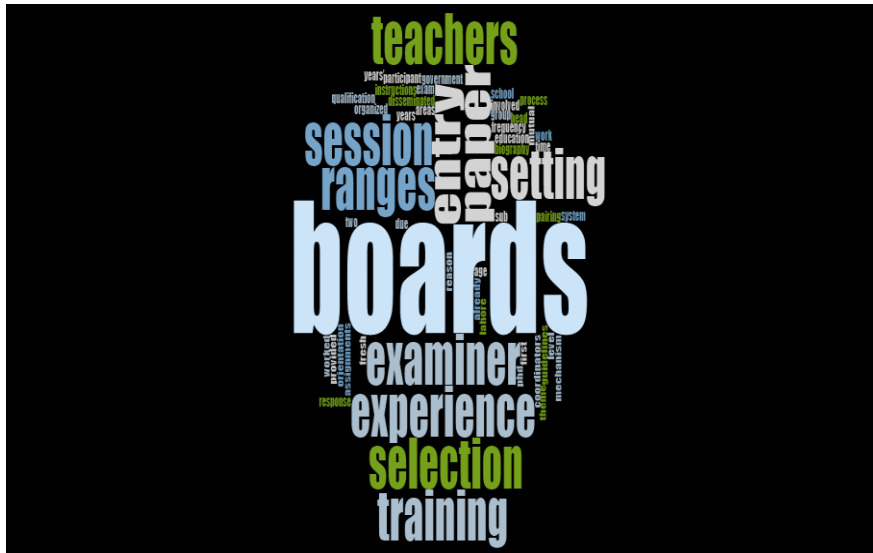


Fig 02: Word count analysis of Theme Areas 1-6



Fig 02 (a) Word Analysis of Theme Areas (i-vi)

boards	experience	session	age	coordina	first	guidelin	level	mechanism	mutual	organized	
	paper	setting	already	dissemin	frequenc	head	orientatio	process	provided	qualific	reason
			areas	due	fresh	instructio	pairing	response	system	theme	time
entry	ranges	teachers	assignme	educatio	governm	involved	participa	school	two	worked	years
			biograph	exam	group	lahore	phd	sub	work	years'	
examiner	selection	training									

Fig 02(b): Frequency Tree of Theme Areas (i-vi)

Interpretation of Results of Fig 02 (a&b)

Word count analysis of 1-6 theme areas identified by interviews of paper setters showed examiners of education boards have entry level experience in most cases and selection of teacher should be on merit and all selected teachers should be trained about key areas of paper setting and marking of answer books. The word cloud image shows paper setting, boards, questions system, training, marking experience are prominent words and used most frequently in interviews of paper setters. It refers to the need of training for question paper setting and marking needs to be strengthened by education boards.



Fig 03 (a): Word count analysis of theme areas (vi-xii)



Fig 03 (b): Word count analysis of theme areas(vi-xii)

paper	system	syllabus	improvement	also	choose	difficult	introduce	just	keeping	kept	key	knowledge
			outline	application	class	discussion	learning	mind	moderate	nature	new	open
		boards		applied	concept	extension	least	outcome	propose	provide	rather	repetition
needs	level		selection	assessment	consider	follow	lot	percentage	reported	setter	setting	specific
	marking	concept		based	custom	improvement	marks	permit	require	staff	stream	study
		distribution	topics	certified	decision	improvement	mcq	poor	restricted	standard	terms	used
questions	setters	experience	training	choose	development	include	merit	preparation	scheme	stereotype	type	whole

Fig. 04: Frequency Tree of theme areas (vi-xii)

Interpretation of Results Fig 03 (a&b)

Results of theme areas 7-12 with frequency tree depicts system of marking and paper setting being pivotal in students evaluation should need to be improved. Level of difficulty of questions should be prerogative of teachers to use facilitation tricks to prepare questions as per required knowledge of assessment.



Fig 05: Analysis of Audio files of Paper Setter’s Interviews

paper	process	marking	mostly	needs	bise	teachin	class	difficul	easy	even	every	examir	gave
				one	discuss	time	good	senior	text	think	topics	answ	days
	level	setter	pairing										
				provided	per	already		mistake	decide	instru	key	makemcq	mem
		board	conside			also							
	question			student	prepare			papers	difficu	prepar	use	work	yes
questions		book	experier	students	scheme	biology	point						
	setting												
		coordinator	long	training	school	chapters	sargod	import	teache	ask	callee	con	sear

Fig. 06: Frequency Tree of Audio Files

Analaysis of audio files of interviews by using N-Vivo analysis technique

Audio files of paper setters interview and marking staff’s reflected that experience of paper setting and qestions writing based on material of text books as per advise of board’s coordinators. Incomplete instructions and no proper sessions of training provided by boards and mostly paper setters used their own exprince of class room teaching for questions writing. Selecion process of paper setters is not transparant and mostly personal refrence based teachers called for this process wihout any consideration of merit.This is the reason sterotype questions are appear in every question paper.

Recommendations of the Study

Following are some recommendations based on above analysis and results obtained from Thematic Analysis of Teachers

1. Paper setting and paper marking systems can be improved when selection of incumbents will be strictly on merit and transparent.
2. Training guidelines need proper revision and must include all prerequisites of good question preparation practices.
3. Time allocation for paper marking needs to be increased and teachers should be provided with time to recheck question papers.
4. The marking of stereo type answers needs to be on the lower side rather teachers should encourage conceptual answers.
5. uniformity in paper setting and marking is the only way to improve system suggestion for sub examiner, concept of students must be kept in consideration in marking if some student gave relevant material with example and did not reproduce bookish knowledge he deserve for full marks.
6. The head examiner should look into full marks answers, medium answers and just pass marks answers side by side to gross total of marks. Paper setter should give conceptual questions in each section to promote thinking process of top students and also give opportunity to average student to get some new knowledge for his future studies.

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