

ASSESSMENT REFORM AND SUSTAINABLE CHANGE IN EDUCATION PART I

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In this two-part paper, the following question is explored: Can assessment reforms serve as an entry point to sustainable change that can also be institutionalised? Part I begins by elaborating the nature of these assessment reforms, and then goes on to describe how these reforms spread across the state of Uttarakhand from 2006 to 2009. It illustrates quantitatively how children's performance changed over these years, how teachers and administrative functionaries felt the need to look at assessment as just one link in a holistic chain of processes, how this need was addressed by those running the Programme, how gaps in the teaching-learning process were identified (and addressed) through methods like Response Analysis and finally suggests that assessment led reforms can penetrate classroom processes. It ends with a glimpse of the institutionalisation of the entire process, later described in detail in Part II.

Keywords: Assessment, Reform, Sustainable and systemic change, Institutionalisation

INTRODUCTION

This paper is an attempt to document an effort on the part of Azim Premji Foundation, in partnership with the governmental Sarva Shiksha Abhiyan (SSA), to trigger change in the quality of primary school education through assessment reform. This paper describes the nature of reforms that were introduced in the state of Uttarakhand, and also details out how this was done. It lays the foundation for assessment reforms leading to changes in education, focuses on such changes as they become apparent first, in altered patterns of assessment tools, then, students' performance (specifically in Mathematics and Environmental Sciences) over a couple of years, and finally, in changed trends in student performance in specific areas of learning. It suggests that the latter could be a reflection of changed classroom processes, by teachers who received feedback from one assessment and may have acted on it in their classroom transactions.

BACKDROP

Using assessment to bring about reform is not a new idea. Linn (2007) has reviewed the use of tests and assessments as

key elements in five waves of educational reform during the past 50 years. Research has shown that assessment can raise standards, and the value that assessment can have in the process of learning as well as for grading work and recording achievement has been widely recognized (Black & William, 1998). While international reports like "Beyond the Black Box" (University of Cambridge School of Education, 1999) suggest ways in which policy changes and networked efforts can bring about such a raising of standards, there is no documented effort in an entire state of India to do the same. ASER (Pratham, India) is one of the foremost studies on student assessment across Indian states. Educational Initiatives, Ahmedabad has designed and conducted (in partnership with others) several studies like the Municipal School Benchmarking Study (2004-2007), UNICEF Learning Assessment Study for Quality Education (2005-2006) and the Andhra Pradesh Randomised Evaluation Study (2004 onwards). While all these studies sample schools across districts and states, the intention was not to engage with the students on a long term basis, post evaluation. None of them addresses the gaps identified through follow up work and long term engagement with the teachers and learners. Therefore, an attempt in this direction was warranted and worthwhile.

'ASSESSMENT' AS AN ENTRY POINT: WHY?

It is widely perceived in India that examinations are perhaps the brush with which the entire canvas of 'education' is painted in most people's minds. Examinations - being essentially content based - largely test the child's capacity to memorize and recall text. Thus, a child may score highly in the tests - without actually possessing the ability to comprehend, analyze and apply knowledge in day-to-day life. What is worse, in the current assessment practice, the pattern of the question paper seems not only to direct but also determine the teaching-learning process - and so the cycle rolls on. An over emphasis on outcomes has been deplored by Krishna Kumar who writes: Thus, 'outcome' or 'result', 'transparency' and 'accountability' have become essential parts of the discourse of quality in education. The emphasis placed on these dimensions of the execution of policy has diminished the acknowledgment of

intrinsic motivation, diversity of styles and context-specificity as values in both teaching and learning (Kumar, 2010).

Through a joint initiative of the Uttarakhand state government and Azim Premji Foundation¹, The Learning Guarantee Programme (LGP) was launched. Its main objective is to advocate a systemic shift in assessment from the traditional test (of rote learning) to a test of a child's understanding, application and problem-solving ability, so as to influence reform in class room processes through reform in assessment. As the programme was not designed to form part of a research study, it is not positioned within any theoretical framework. It was recognised that, since the parameters of this examination would be different (Appendix I for contrasting examples of tools) from the current tests that take place, the chances of many schools performing satisfactorily are low. So as a first step, the Programme intended to let the schools / teachers know the kind of assessment proposed in advance and then leave them to decide whether or not they wish to assess their students through this new kind of examination. It was the first time primary school teachers were engaging in a serious discussion on evaluation. To begin with, the Programme restricted itself to the test of cognitive abilities. The initial focus was on the three core subjects, i.e. Hindi, Math and EVS for Classes I to IV. By providing detailed and transparent feedback on their performance to schools, teachers and all stakeholders, it was also recognised that change is a gradual process and, therefore, schools had to be given a few years to demonstrate their progress.

A few years after the Foundation began its Learning Guarantee Programme, the National Curricular Framework 2005 (Executive Summary, NCF 2005) (NCERT, 2005) also drew attention² to the current examination system and the need for reform within it. At the time (2005) that Azim Premji Foundation began its LGP programme in the state of Uttarakhand, the overall status of examinations in the state can be guessed from the following statistic (Pratham, 2005): 51.3% of children of Std II to V in government schools could not read a text that had a difficulty level of Std II. 40.9% children of the same classes could not solve math problems that required two-digit subtraction with borrowing, and 72.6% could not divide 3-digit numbers by 1-digit number. By and large, in the state of Uttarakhand in 2005, evaluation at the primary school stage was not treated seriously. While there was evidence of (only the summative, annual) evaluation in some primary schools, there were also schools where these answer sheets remained uncorrected and others where no evaluation was even carried out. The general practice was to buy question papers from the market, and administer them in end-of-year examinations, that demanded rote learning. Not surprisingly, almost no evidence was found of attempts to get feedback of the teaching-learning process from evaluation, so as to then take corrective measures. Thus, evaluation was mostly seen as a fearful and child-unfriendly process.

The Learning Guarantee Programme was first launched as a pilot (Classes I to V only) in 2 districts, Uttarkashi and Uddhamsingh Nagar (the two worst performing districts of the state in Reading & Arithmetic, as per ASER 2005 (Pratham, 2005) in October 2005. By 2009, it had spread to (Classes I to VIII of) all thirteen districts of the entire state of Uttarakhand, providing a platform for voluntary school participation and outstanding and visible recognition for 'performing schools' and their communities.

What is assessment? When the Programme began in Uttarakhand, assessment appeared (as it did elsewhere too) to be an isolated tool meant to eliminate non-performers. Although the state had introduced a system of Continuous Comprehensive Evaluation (CCE), this, too, only served to reinforce rote learning, in the few places where it was active. The need was felt to make assessment be seen as a diagnostic element of a holistic loop of processes. Feedback gained from one assessment (of conceptual difficulties, erroneous understandings and skills that need honing) had to trigger greater thought than going into the next lesson's transaction, rather than merely focusing on the deficiencies in the learner. Efforts needed to be directed to analyse where the children are currently, and where the curriculum expects them to be. This knowledge, when ploughed back iteratively into the classroom processes, should reflect in the bridging of this gap and successively better learning.

METHODOLOGY

Partnering the government is intricately woven into the Foundation's philosophy. While any Non-Profit-Organisation (NPO) can exercise speed, flexibility, community support and micro management, this may, in fact, become impossible to replicate when the same experiment is sought to be scaled up and integrated into the main system. Azim Premji Foundation takes advantage of the stamina and the ability of the government education system to roll entire machinery for replication and coverage of increased geographical areas. The NCF 2005 was kept as the broad canvas for all perspective building. This is a conscious policy decision in the Foundation.

Broadly, the methodology adopted was as follows: assessment tools being the backbone of the Programme, considerable efforts were taken by the State and the Foundation in the development of 'competency based'³ question papers. The papers were made by a group consisting of academic experts from the DIETs, SPO, DPO and SCERT in which, 40% of the participants were practising school teachers from the districts. Post evaluation, student responses were analysed and feedback was given to all participating schools so that the teachers could understand areas of difficulty for their students, and plan on addressing the same in their classes. The Foundation has developed a large scale, systematised process (Response Analysis) (Sarangi, 2009) to engineer the shift from

assessment of learning to assessment for learning (see example in Appendix II). In addition to this, needs which emerged from the field were addressed on an ongoing basis: e.g. when teachers felt that the Foundation had to help them with more than just designing of assessment tools, new (formerly unplanned) structures and processes spontaneously emerged as each such need was addressed.

ASSESSMENT TOOL DEVELOPMENT

From blueprint development to setting of question paper, teachers were facilitated by the Foundation in the whole process of designing competency-based assessment tools. From 2005-2009, 60x2=120 sets⁴ of competency based assessment tools have been developed for classes 1-5, complete with answer keys and flash cards to be used as TLM in the examination. A key novelty in the tools is the application of a large amount of artwork (to illustrate a question) and flashcards (to act as cues for oral responses). As the LGP moved into its second year, teachers of participating schools felt that the Foundation members were not spending enough sustained time with them. Only if they did so, the teachers felt, would the programme reflect a detailed understanding of the classroom processes and not look at evaluation in isolation. Thus, the need to look at assessment as part of a whole was emerging from the ground.

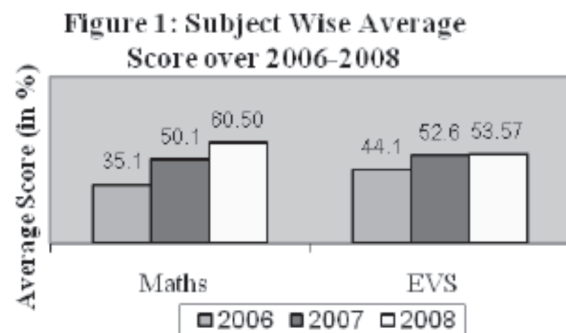


Figure 1: Subject wise average score over 2006-2008

Therefore, schools were then helped to understand better terms like ‘competency’ and ‘blueprint’, and why different weightages were given to “Oral” and “Written” segments of question papers at Grades I, II, and III. This interaction resulted in the development of a document termed a School Preparedness Plan, one of the first steps towards the goal of institutionalizing the whole process.

PERCOLATION OF ASSESSMENT REFORM INTO THE CLASSROOM

Research has shown (Pollard, 2000) that when tests pervade the ethos of the classroom, test performance is more highly valued than what is learned (Perry, 1998). The use of repeated

practice tests impresses on pupils the importance of the tests: and encourages them to adopt test-taking strategies designed to avoid effort and responsibility. Paris, Lawton, Turner and Roth (1991) find that repeated practice tests are detrimental to higher order thinking. Thus, the importance of impacting classroom processes through assessment reform was felt acutely by the Foundation team, right from the start. For a start, feedback of the children’s performance in 430 schools was shared with all participants, in the first year of the programme. Once it became clear that different children were finding certain concepts, skills and ideas tough to master, the realization dawned amongst functionaries that classroom processes need to change in concomitance with the new way of assessing, if at all they could sustain this change. Acting on feedback generated in the LGP meant that the Foundation had to come up with alternative teaching strategies for the ‘hard spots’ or ‘difficult concepts’ and train teachers in these. A booklet, *Manthan*, was brought out as a first step to address this. This was developed through workshops, in which teachers participated (sample page from *Manthan* in Appendix III).

However, in the third year, it was found that specific school-level difficulties were not addressed through *Manthan* alone. While many teachers and schools adopt diagnostic techniques to scrutinise performance in tests and arrive at gaps in teaching and learning, response analysis as conducted by the Foundation is the first large scale systematisation of this process. Thus, response analysis⁵ was done in 2008 and 2009 in two districts of Uttarakhand – to analyse a total of 3900 answer sheets. This revealed many other gaps in the teaching-learning process, and it was realized both by the Foundation and the DIET officials that Institutional Capacity Building was needed. Thus, emerged the design of what was termed a ‘School Progress Plan’, meant to allow each school to look closely at that particular school’s specific needs.

RESULTS

Although a plethora of data has been collected, only selected results are analysed here. While any assessment study will focus on student performance as an indicator, here, two parameters are scrutinised: student performance, and changed student performance in specific areas of difficulty. Both are measured here through average scores, considering the large number of children who were evaluated. The rationale for selecting these two parameters here is to see if the changed assessment pattern reflects in (a) better student performance, as students and teachers move away from rote-based learning (b) competency-wise analysis of weak spots and follow up action taken to address these gaps in learning, which should show up as an improvement in average scores in precisely those areas of learning.

(a) Student Performance: Figure 1 depicts subject-wise average scores in Math and EVS over three years, for all children of

classes I to IV evaluated⁶ in this period. While the performance in both subjects does appear to be improving from 2006-8, it must be admitted that the level of difficulty of papers was not moderated to be similar/identical in all three years. Therefore, the rise in levels of performance is not necessarily indicative of higher levels of learning. However, when Class II & IV papers were adjusted for difficulty levels (Foundation, 2010), a slower rate of improvement - barring Class II Math 2007 results - was observed (Figures 2a and 2b). Thus, with caution, too, one can conclude that there is a slow trend of improvement in performance over the years.

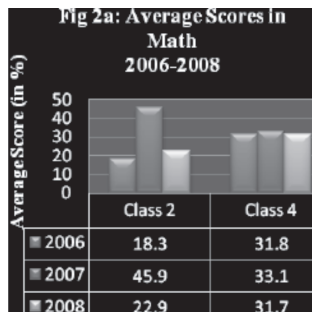


Figure 2a: Average scores in math 2006-08

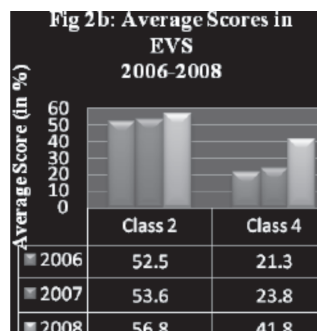
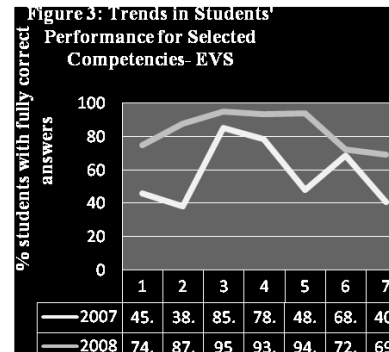


Figure 2b: Average scores in EVS 2006-08

(b) Competency wise analysis of students' performance (the same class over two years) may be a possible indicator of efforts taken by the teacher of that class to address last years' weak competencies. Often, 'hard spots' in a subject repeat themselves in a mechanical fashion over batches of students. Once a teacher of a particular class receives feedback from one year's Response Analysis – of the weakest competencies of the students that year – (s)he should make the effort to address this problem with his/her next batch of students. Unless the fruits of Response Analysis are evidenced through an improvement in performance in students' areas of difficulty, over the years, the percolation of assessment reforms into classroom processes cannot be assumed.

Understanding patterns of errors through Response Analysis was done in 26 schools (two in each of all thirteen blocks of the two districts, Uttarkashi & Uddhamsingh Nagar) by analysing 1560 answer sheets in 2007-2008. In 2008-2009, 2340

answer sheets from 39 schools (3 from each of 13 blocks of the same two districts) were analysed.



Description of codes used in Figure 3

Code Class: Competency- Oral (O) Written (W)

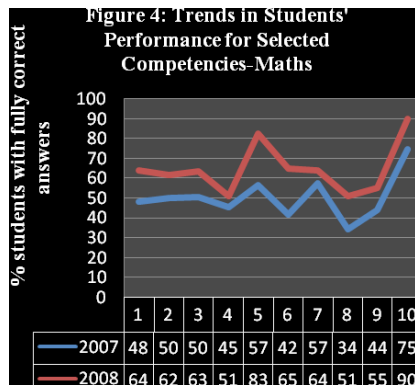
- 1 I: Personal Cleanliness- understanding of personal hygiene (O)
- 2 I: Understands seasons and weather (O)
- 3 I: Local means of transport (O)
- 4 I: Identifies organs of the human body through pictures (O)
- 5 II: Names of organs & their functions (O)
- 6 II: Fairs and festivals(O)
- 7 IV: Work and Energy (W)

Trends in selected weak competencies across a set of 430 schools (in 2007 and 2008) are shown in Figures 3 & 4. The performance of students in the selected competencies was better in 2008 than in 2007, suggesting a change in classroom processes to address the areas of difficulty that emerged out of Response Analysis in 2007. In order to find out whether there truly was a change in classroom processes, so as to reflect in the above improved results, the School Progress Plans, described in Part II, would need to be scrutinised.

It would be interesting, of course, to find out what happened to the same batch of students as they moved up from one class to another. If Response Analysis showed their difficulty in mastering a competency in Class II, e.g. subtraction of two digit numbers, how then did they master a higher level of this competency (subtraction of three digit numbers with borrowing) in Class III? This is shown in Figure 4 of Part II of this paper.

CONCLUSION

The above experience suggests that assessment reform can serve as an entry point to bring about change in the quality of primary education, if the fanning out of assessment reform, into the loop of processes that it is linked to, ensues naturally as delineated above. Thus, sustained effort needs to be directed towards analysing student responses, identifying areas of difficulty and feedback thus obtained should be incorporated into classroom processes and structure, on an



Description of codes used in Figure 4

Code Class: Competency- Oral (O) Written (W)

- 1 I: Identifies big and small numbers/ compares 2 digit numbers (O)
- 2 I: Counting in Sequence/ arranges numbers in ascending and descending order (W)
- 3 II: Solves word problems in multiplication (O)
- 4 II: Writes numbers in words (W)
- 5 II: Number sense- writes numbers that come before and after (W)
- 6 II: Division- of 2 digit numbers with single digit divisor (W)
- 7 III: Reads a clock (O)
- 8 III: Solves word problems in divisions (3digit numbers with single divisor) (W)
- 9 IV: Finds factors of numbers (O)
- 10 IV: Adds upto 5 digit numbers (W)

ongoing basis. By the very nature of its flow, this programme has illustrated the undeniable interconnectedness of assessment to classroom processes and the importance of enrolling teachers into this change. By accepting assessment as a cycle that regenerates itself, and not one which terminates every year in the annual examination, the notion of assessment – even learning—is viewed differently by teachers participating in this programme. More details on institutionalisation of this process are described separately in Part II of this paper.

NOTES

¹ Azim Premji Foundation is a not-for-profit organization with a vision to “Significantly contribute to achieving quality universal education to facilitate a just, equitable and humane society”. The approach is to focus on quality of education in rural government schools, carry out in-depth research and impact assessment. The purpose is to experiment and evolve solutions and “proof of concept” for systemic change.

² According to the Framework, examination reforms constitute the most important systemic measure to be taken for curricular renewal and to find a remedy for the growing problem of psychological pressure that children and their parents feel, especially in Classes X and XII.

³ The difficulty in working in the regional tongue as well as in expanding the work across the state precluded a more

precise defining of the term ‘competency’, which would have been more in alignment with international conventions. Internationally, the word ‘competency’ is meant to convey what one does with knowledge, skill or understanding that one has gained. However, this word is loosely used in the Foundation’s work and throughout this paper, to cover any of the following: knowledge (as in a learning area), a skill, understanding, a value or an attitude.

⁴ An alternative paper was designed for each question paper, so that one could be field tested and the other used.

⁵ Response Analysis: Understanding children from their frame of reference - Abhishek S. Rathore and Falguni Sarangi - paper presented at the Second Peoples Education Congress (Oct. 05-08 2009, Homi Bhabha Centre For Science Education, TIFR, Mumbai).

⁶ In 2006 – 38,023 children, in 2007 – 41,739 children and in 2008 – 67,236 children were evaluated.

Abbreviations used: ASER- Assessment Survey Evaluation Research; BRCC- Block Resource Centre Co-ordinator; CCE- Continuous Comprehensive Evaluation; CRCC- Cluster Resource Centre Co-ordinator; DIET- District Institute of Educational Training; DPO- District Project Officer; EVS- Environmental Science; LGP- Learning Guarantee Programme; NCF- National Curriculum Framework; NPO- Non-Profit Organization; SCERT- State Council of Educational Research and Training; SPO- State Project Officer; SSA- Sarva Shiksha Abhiyan; TLM- Teaching- Learning Material; UNICEF- The United Nations International Children’s Fund.

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दक्षता – दो अंक की संख्याओं का हासिल वाला जोड़ करना।

प्रश्न – जोड़िए।	सेट- अ	सेट- ब
	4 6	5 7
	+ 2 7	+ 2 6

इस प्रश्न में बच्चों से यह अपेक्षा है कि वे दो अंको की संख्या का हासिल वाला जोड़ पाये। इस सवाल को हल करने के लिए संख्या पहचानना, गिनती, जोड़, हासिल, स्थानीय मान एवं हासिल और स्थानीय मान के सम्बन्ध को जानना अनिवार्य है। इनमें से कोई भी एक अवधारणा अगर स्पष्ट नहीं है तो बच्चे इस प्रश्न का सही उत्तर नहीं दे पाएंगे।

गलत एवं आंशिक रूप से सही उत्तरों का विश्लेषण करते हुए जो सबसे महत्वपूर्ण बात सामने आयी वह इस प्रकार के उत्तरों में झलकती है –

5 7	5 7	4 6	5 7
+ 2 6	+ 2 6	+ 2 7	+ 2 6
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713	613	713	731

अधिकतर बच्चों ने ऐसी ही गलतियां की है। इसमें दो उप श्रेणियां बन सकती हैं।

क- बच्चे जिनमें स्थानीय मान (इकाई-दहाई) की समझ है (हासिल की अवधारणा नहीं है।)

ख- बच्चे जिनमें स्थानीय मान (इकाई-दहाई) की समझ नहीं है।

दोनों ही (क एवं ख) श्रेणियों के बच्चों में जो सबसे पहली व महत्वपूर्ण अवधारणा है – संख्या, उसी में दिक्कत है। यह बच्चे 57 में 5 और 7 के अंक तो समझ रहे हैं पर 57 को एक पूर्ण संख्या के रूप में नहीं देख पा रहे हैं। इसी वजह से यह बच्चे

5 7 को	5 एवं	7 में
+ 2 6	+ 2	+ 6

तोड़कर अलग-अलग जोड़ कर रहे हैं। एक अंक के जोड़ में यह बच्चे दक्ष है यह बात मौखिक परीक्षा में पूछे गये सवाल से भी जाहिर होती है, जिसमें इन सब बच्चों ने एक अंक के जोड़ को सही किया था। उप श्रेणी (क) में वे बच्चे हैं जिन्होंने 713 या 613 जवाब दिया है। यह बच्चे 7 और 6 को जोड़कर 13 लिख रहे हैं, यानी इकाई के स्थान में 3 और दहाई के स्थान में 1 लिख रहे हैं। स्पष्ट है कि यह बच्चे इकाई-दहाई समझते हैं, पर हासिल की अवधारणा नहीं है और न ही हासिल एवं इकाई-दहाई के सम्बन्ध की।

उपश्रेणी (ख) में वह बच्चे हैं जिन्होंने 731 जवाब दिया है। इन बच्चों ने जब 7 और 6 को जोड़ा तो 13 न लिखकर 31 लिखा है। मन में उन्होंने गिनकर शायद 13 ही सोचा होगा, पर जब कागज कलम में उतारने की बात आती है, तो इकाई, दहाई के स्थान में गलती कर देते हैं। इससे यह स्पष्ट होता है कि इनमें एक अंक के जोड़ की दक्षता तो है पर इकाई दहाई की अवधरणा की समझ नहीं बन पाई है।

बच्चों के प्रश्न पत्र देखकर हम स्वयं इन उत्तरों के अनुसार संख्या पहचान के ज्ञान, स्थानीय मान, हासिल की अवधरणा को जाँच सकते हैं। यह सारी अवधरणायें चूंकि अमूर्त है तो जरूरी है कि हम कुछ ऐसे प्रयास करें कि बच्चे इन अवधरणाओं को पहले ठोस वस्तुओं की सहायता से समझ पाए और फिर कागज कलम पर।

कई बच्चों ने शायद इस प्रश्न में घटाने की कोशिश की है – इन उत्तरों को देखकर यही प्रतीत होता है जैसे –

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 57 \\
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 27
 \end{array}$$

इनमें भी केवल दहाई के अंक को घटाया गया है। बच्चों दो अंक की संख्या को सम्पूर्णता में नहीं समझ पा रहे, साथ ही '+' के चिन्ह को नहीं पहचानते और न ही इकाई-दहाई की अवधरणा इन्हें आती है। इस प्रकार के उत्तरों का और क्या विश्लेषण हो सकता है – समूहों में परिचर्चा हो सकती है।

कुछ उत्तर इस प्रकार आये हैं –

$$\begin{array}{r}
 57 \\
 + 26 \\
 \hline
 85
 \end{array}
 \qquad
 \begin{array}{r}
 57 \\
 + 26 \\
 \hline
 88
 \end{array}
 \qquad
 \begin{array}{r}
 57 \\
 + 26 \\
 \hline
 48
 \end{array}
 \qquad
 \begin{array}{r}
 57 \\
 + 26 \\
 \hline
 857
 \end{array}
 \qquad
 \begin{array}{r}
 57 \\
 + 26 \\
 \hline
 2+6
 \end{array}$$

हैरत की बात यह है कि इन बच्चों ने मौखिक में एक अंक के जोड़ का सही जवाब दिया है। एक और जो बात दिखती है वह यह है कि हर एक उत्तर में 8 आ रहा है और एक उत्तर में 2+6 लिखा गया है। किसी कारण इन बच्चों ने शायद 26 को 2 और 6 देखते हुए उसे जोड़ा है। पर यह तो आधी बात ही हुई— दूसरा अंक जैसे 4, 5 बच्चे क्या समझकर लिखे हैं यह सोचने की बात है। इस प्रकार के उत्तर पर भी चर्चा होना आवश्यक है।

छोटे-छोटे समूहों में इस उत्तर पर विश्लेषण करें एवं इस बात पर भी गौर करें कि कुछ बच्चे संख्या उल्टा क्यों लिखते हैं। 3 की जगह 6, और 7 की जगह 7 और कुछ बच्चे किस तरह हिन्दी एव अंतरराष्ट्रीय अंक एक साथ लिखते हैं जैसे – 9, 3