Chen, W. et al. (Eds.) (2016). Proceedings of the 24th International Conference on Computers in Education. India: Asia-Pacific Society for Computers in Education

Teacher Support and Personalised Student Learning as Means to Obtain Visible and Measurable Improvement in Learning Levels

Nishchal SHUKLA[a*], Pranav KOTHARI[a*]
[a]*Educational Initiatives Pvt. Ltd., India*
[*]*nishchal@ei-india.com*

Abstract: Learning levels of students in government schools of India have been found to be low. Need to provide relevant ICT-based personalised learning material to them as well as the need to support the teachers and build their capacity was identified as the major focus area for an intervention in Gujarat. This poster presents the intervention and the improvement shown by the intervention schools in the past 4 years. Overall net improvement shown by the intervention group seems positive. Item-wise analysis indicates that the intervention group is doing relatively better than the control group on the conceptual/application-based items.

Keywords: Student assessment, Personalised learning, Adaptive learning, Teacher support

1. Introduction

Large-scale assessment studies conducted in India have pointed out the low learning levels of students in the government schools across India (Student Learning Study, 2009). Most of the grade 8 students typically don't understand the outcomes expected by grade 4 (ASER, 2015). Factors related to teacher capacity, needs and attention to individual student learning levels play a crucial role in the overall status of learning among students.

The "Learning Assessment & Learning Improvement Programme" aimed to obtain visible and measurable improvement in the learning levels of students of classes 3-8, over a 5-year period starting from 2011.

2. Methodology

2.1 Intervention group

This group consisted of 18 schools from 5 different locations in a state of Gujarat in India. The first year of the intervention, 2011, focused on grades 3, 4 and 5 and in each subsequent year, a grade was added. In the fourth year of the intervention, 2014, all the intended grades, 3 to 8, were incorporated. Year 1 covered 2676 students across grades 3 to 5 whereas Year 4 covered 4893 students across grades 3 to 8.

For the purpose of this analysis, we will be considering only students who have gone through the intervention for all the past 4 years.

2.2 Intervention

The intervention included –

i. Continuous Teacher Support (CTS): This component aimed at providing continuous support to teachers keeping in mind their specific needs and student gaps. Every year subject experts carried out 9 visits for 3-5 days in each location for ensuring adequate support to teachers, including observation of the teacher's

class, demo lessons by the facilitator, review of notebooks, test papers, classroom displays, Teaching Learning Materials (TLMs) and pedagogical guidance through focused ground engagement programme in a non-threatening and supportive manner.

ii. Personalised learning: It provided personalized adaptive ICT-based learning to students through the Intelligent Tutoring System (Corbett, Koedinger and Anderson, 1997) called Mindspark, developed by Educational Initiatives. Students were prescribed to do Mindspark sessions of 30 minutes, twice a week for both the subjects. In an academic year, students were expected to use at least 30 hours for Language and 30 hours for Math.

Three main principles underlying the basic design of these interventions were – i) students learn best when they are engaged actively by asking questions at their current learning level – when they get into "flow" state (Csikszentmihalyi, 1998); ii) data generated by students' use of Mindspark can contribute deeper insights into how students learn and what teachers should focus on iii) investment in system-level structures around the use of student learning data generated by Mindspark can empower administrators and decision makers to provide appropriate and timely support.

2.3 Assessments

In order to assess the effectiveness of the intervention, and to provide direction to teachers as to what students are learning, students were assessed on the key skills and concepts. A baseline was conducted in July 2011 and thereafter, students were assessed annually, at the beginning of the academic year, in July.

2.4 Control group

7 schools from 3 different locations in Gujarat, were selected fro the control group. The size of the control group was around 40% of the intervention group.

3. Results

3.1 Net year-on-year improvement

Year-on-year improvement in the assessment scores for the students who have gone through all the 4 years of intervention was checked. They are students who took the baseline when they were in grade 3 and are now in grade 7 (Group 1) and those who were in grade 4 and are now in grade 8 (Group 2).

Since Language and Math were the primary subjects of intervention, we looked at the improvement in scores for these two subjects year-on-year. Net improvement for the intervention group was calculated by subtracting the control group improvement from the intervention group improvement.

$$Net\ Improvement = \left(\frac{Y_x - Y_{x-1}}{Y_{x-1}}\right)_{Intervention} - \left(\frac{Y_x - Y_{x-1}}{Y_{x-1}}\right)_{Control}$$

Table 1. Net year-on-year improvement

Grade	Subject	2011-12	2012-13	2013-14	2014-15
Group 1	Language	-71.1%	47.3%	10.5%	2.6%
Group 1	Math	-52.4%	50.8%	-11.1%	13.9%
Group 2	Language	17.2%	36.1%	-3.0%	4.9%
Group 2	Math	42.3%	17.3%	9.7%	9.5%
	Overall	-11.8%	37.1%	1.8%	8.0%

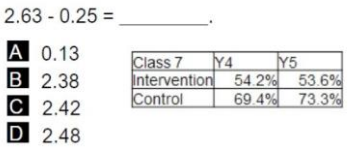
Except the first year of intervention, the overall net improvement shown by the intervention group was positive all the subsequent years. Second year showed a high jump after which the improvement stabilized and didn't show drastic improvement.

3.2 Item-wise analysis

On 13 out of 19 identical repeat items in Math and 10 out of 17 in Language, the intervention group showed improvement. The items showing improvement were spread across different skills - procedural/recall skills as well as conceptual/application skills.

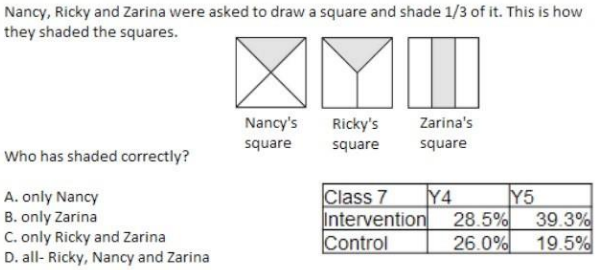
A lot of items where the intervention group showed more improvement and were still ahead of the control schools seemed to be non-straightforward items testing conceptual/application skills. Whereas items where the intervention group was behind the control group seemed to be straightforward items testing recall/procedural skills.

Figure 1 shows an example of a straightforward item showing control group outperforming intervention group. Figure 2 shows an example of a non-straightforward item showing intervention group outperforming control group.



Class 7	Y4	Y5
Intervention	54.2%	53.6%
Control	69.4%	73.3%

Figure 1. Subtraction of two decimals



Class 7	Y4	Y5
Intervention	28.5%	39.3%
Control	26.0%	19.5%

Figure 2. Identifying the shape that is 1/3 shaded

4. Discussion

Since the study was designed to study the combined effect of CTS as well as Mindspark, the individual contribution of the two components to the overall improvement could not be found out. Both the interventions, CTS as well as Mindspark, evolved over the year and so the improvement numbers should be seen considering the fact that learning consolidation and compounding is playing a role.

Detailed school-wise analysis and linkage to certain observations made in the field indicated that the classrooms with high teacher absenteeism or irregularity in teaching showed a negative or no improvement.

The improvement shown by the intervention group seems promising and the study needs to be refined so as to study individual effects of the intervention.

References

Student Learning Study (2009). Status of Student Learning across 18 States of India in Urban and Rural Schools. http://www.ei-india.com/wp-content/uploads/2012/07/Student-Learning-Study-Issue-9.pdf.

ASER, Annual Status of Education Report 2015

Csikszentmihalyi, Mihaly (1998). Finding Flow: The Psychology of Engagement With Everyday Life. Basic Books.

Albert T Corbett, Kenneth R Koedinger, and John R Anderson. (1997) Intelligent Tutoring Systems. Handbook of Human computer interaction, pages 849–874