1. Need for Integrated Data Systems
2. Implementation of E-Hazar, Assessments
3. APeKX, Digital & Virtual class Rooms
4. Data Analysis and Visualization
5. Moving Ahead… and other student impact initiatives
Need for Integrated Data Systems

**Situation across India**
1. Cumbersome and expensive to manage services
2. Breeding of unethical practices and grievances
3. Minimal use of isolated data sets in different Departments

**Vision for Andhra**
1. One stop online portal for all education services
2. Streamlined, transparent & accountable administration
3. Data driven governance with reliable cross data analytics

**Overall objective**
- Ease in Administration with Integrated data systems and applications
- Real-time governance through improved data access for decision making
- Seamless service delivery for direct benefit transfer
Leveraging Integrated Data Systems & Applications – 3 Verticals

Schools

- School Information
- Infrastructure & Facilities
- Mid-Day Meal Management
- eHAZAR - AEBAS
- Rationalization of Schools
- Analytics and integration

Teacher Services

- Teacher Profile
- Attendance
- No-Objection Certificate
- Medical reimbursements
- Online teacher transfers & web counselling
- Andhra Pradesh e-Knowledge Exchange
- Leave Management
- Grievance Redressal

Students

- Transition Profile
- Transition & Dropout Tracker
- Student Assessments
- Textbook indenting
- Uniform distribution
- Bicycle distribution
- Mid-day meals

Leveraging Integrated Data Systems

- Analytics and integration
- Mid-Day Meal Management
- eHAZAR - AEBAS
- Rationalization of Schools
- School Information

3 Verticals

- Students
- Teacher Services
- Schools
Key Input Modules

- UDISE + State Supplementary Variables
- Student Information System
- Student Assessments System
- Teacher information System
- AADHAAR
- Student & Teacher Attendance
- Geographic Information System (GIS)
- Midday meal Information System
School Education Web Portal

School Education Web Portal developed to provide access to information, services and dashboards for monitoring to ensure quality education services in Andhra Pradesh State.

cse.ap.gov.in
Steps taken and Time Line - To improve Data Quality

- **2014-15**: Created Student Information
  - Child Info: 64.5 Lakhs
  - Aadhaar Seeding: 52%
  - UDISE: 72.1 Lakhs

- **2015-16**: Integrated Student Information with UDISE
  - Integrated UDISE: 69.6 Lakhs
  - Aadhaar Seeding: 92%

- **2016-17**: Mandated Aadhaar/EID in Student & Teacher Information
  - Integrated UDISE: 68.5 Lakhs
  - Aadhaar Seeding: 100%
  - Govt. Teacher Data 1.76 lks -

- **2017-18**: Introduced eHazar
  - Aadhaar enabled Biometric Attendance

- **2018**: Implemented eHazar in All Govt. Schools covering 92% Teachers
  - Achieved 97% Aadhaar enabled Biometric Attendance
2.e-Hazar – Objectives & Implementation

- **Aadhaar-Enabled Biometric Attendance System (AEBAS)** to capture Daily Attendance of Teachers & Students at School points.

- **Track potential Student Drop-Outs**

- **Maps Attendance to coordinate with Student Assessment, Performance and Feedback**

- **Capture Teacher Attendance twice a Day;** address absenteeism, enable planning/provisioning substitutes in place of teachers on long leave

- **Transparent and accountable delivery of services** including, Mid-Day Meal, Free Text books, Uniforms, Bicycles for Girl Children, etc.
Trend Analysis of e-Hazar (since adoption in August 2017)

Action Taken to ensure adoption and improve Attendance Percentage:

- Ground Level Sensitization
- Regular High Level Monitoring
- At 11 am daily reminder/alert messages to teachers that did not mark/Apply Leave/On OD
- Larger context of AEBAS in all State Government Offices & for all Employees.
Introduction of APeTLS

• During initial days of Teacher e-Hazar, there was about 85% attendance, marked at the peak level.

• After ground level analysis, a further need to improve teacher attendance monitoring was felt.

• Leave Management System - APeTLS introduced for registering the Leaves / OD/ Trainings for teachers.

• This Mobile App facilitates teachers to apply for Leave from their personal mobile saving time and with minimum extra effort.

• For instance, teacher attendance on 25-01-2018 was 86.4 %. Taking the OD/Leaves, Trainings into consideration it is actually 92.4 %, enabling a near perfect monitoring of teacher presence in schools.
### Month Wise Analysis of E-Hazar

<table>
<thead>
<tr>
<th>Month</th>
<th>Total Teachers enabled eHazar</th>
<th>Total Teachers Present</th>
<th>Attendance %</th>
<th>On Leave</th>
<th>Leave %</th>
<th>On Duty</th>
<th>On Duty %</th>
<th>On Holiday</th>
<th>Holiday %</th>
<th>Total Teachers marked eHazar &amp; APTeLS</th>
<th>% of Attendance after considering Leave/Duty Holiday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct, 2017</td>
<td>134687</td>
<td>91290</td>
<td>53.84</td>
<td>945</td>
<td>0.69</td>
<td>595</td>
<td>0.46</td>
<td>0</td>
<td>0.00</td>
<td>133149</td>
<td>68.41</td>
</tr>
<tr>
<td>Nov, 2017</td>
<td>153622</td>
<td>107926</td>
<td>69.94</td>
<td>5212</td>
<td>3.38</td>
<td>3263</td>
<td>2.12</td>
<td>263</td>
<td>0.15</td>
<td>144906</td>
<td>75.42</td>
</tr>
<tr>
<td>Dec, 2017</td>
<td>157876</td>
<td>109805</td>
<td>69.19</td>
<td>15308</td>
<td>9.62</td>
<td>6377</td>
<td>4.11</td>
<td>2401</td>
<td>1.48</td>
<td>133819</td>
<td>84.39</td>
</tr>
<tr>
<td>Jan, 2018</td>
<td>175280</td>
<td>129999</td>
<td>80.94</td>
<td>6994</td>
<td>4.06</td>
<td>8390</td>
<td>4.79</td>
<td>2268</td>
<td>1.29</td>
<td>147651</td>
<td>92.01</td>
</tr>
<tr>
<td>Feb, 2018</td>
<td>164897</td>
<td>128523</td>
<td>77.69</td>
<td>16053</td>
<td>9.67</td>
<td>10483</td>
<td>6.41</td>
<td>4906</td>
<td>3.10</td>
<td>159964</td>
<td>96.87</td>
</tr>
<tr>
<td>Mar, 2018</td>
<td>170985</td>
<td>125439</td>
<td>73.32</td>
<td>12871</td>
<td>7.54</td>
<td>24212</td>
<td>14.25</td>
<td>2435</td>
<td>1.39</td>
<td>131471</td>
<td>96.48</td>
</tr>
</tbody>
</table>
Integration of e-Hazar w/other Services

- Andhra Pradesh, has successfully implemented e-Hazar in SSC Examinations of AY 2017-18.

- The e-Hazar is being implemented in conduct, record-keeping of Teacher Trainings.

- Bicycles for 9th class girl students (1,87,318 students) were distributed through Aadhaar enabled Biometric System.

- For MDM rice distribution real-time integration was made with ePOS of Civil Supplies and distribution is being done through Aadhaar enabled Biometric System.

## SSC Invigilation Report as on 26.03.2018

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>District</th>
<th>No. of Centres</th>
<th>No. of Invigilators Marked eHazar</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SRIKAKULAM</td>
<td>183</td>
<td>2038</td>
</tr>
<tr>
<td>2</td>
<td>VIZIANAGARAM</td>
<td>137</td>
<td>1564</td>
</tr>
<tr>
<td>3</td>
<td>VISAKHAPATNAM</td>
<td>240</td>
<td>2663</td>
</tr>
<tr>
<td>4</td>
<td>EAST GODAVARI</td>
<td>301</td>
<td>3742</td>
</tr>
<tr>
<td>5</td>
<td>WEST GODAVARI</td>
<td>239</td>
<td>2618</td>
</tr>
<tr>
<td>6</td>
<td>KRISHNA</td>
<td>268</td>
<td>3138</td>
</tr>
<tr>
<td>7</td>
<td>GUNTUR</td>
<td>274</td>
<td>3249</td>
</tr>
<tr>
<td>8</td>
<td>PRAKASAM</td>
<td>180</td>
<td>2383</td>
</tr>
<tr>
<td>9</td>
<td>NELLORE</td>
<td>169</td>
<td>1921</td>
</tr>
<tr>
<td>10</td>
<td>KADAPA</td>
<td>164</td>
<td>1835</td>
</tr>
<tr>
<td>11</td>
<td>KURNOOL</td>
<td>226</td>
<td>2780</td>
</tr>
<tr>
<td>12</td>
<td>ANANTAPUR</td>
<td>188</td>
<td>2628</td>
</tr>
<tr>
<td>13</td>
<td>CHITTOOR</td>
<td>261</td>
<td>3033</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>2830</strong></td>
<td><strong>33,592</strong></td>
</tr>
</tbody>
</table>
Online Teacher Transfers & Web Counseling

- Criteria of eligibility established for transfers of teachers & Head Masters
- Point system set in place to determine transfer success
- List of preferential categories released that take precedence in seniority list, irrespective of entitlement points

- Finalization of seniority lists
- Notification of vacancies list released
- Options exercised by teachers through web based counselling
- Online transfer orders issued by respective Committee duly following selection procedure

Transparency & faith
Saves time & human effort
Lesser grievances
Various Assessments & Surveys Conducted in Andhra Pradesh [State-led and National Assessments]

**Overall Objective:**
understanding the competency gaps in students & target interventions to address the gaps

- **National Achievement Survey (NAS) - 2017**
  For Classes 3, 5, 8 & 10

- **Annual Survey of Education Report (ASER) - 2017**
  2016 – Classes 2 & 3 (3Rs)
  2017 – Classes 4 & 8 (SLAS)

- **3Rs & Student Learning Achievement Survey (SLAS)**
  2016 – Classes 2 & 3 (3Rs)
  2017 – Classes 4, 6 & 9

- **SSC Public Examinations - 2018**
Machine Learning Model – Drop Out Prediction, 2018

<table>
<thead>
<tr>
<th>Dropout Influencing Factor</th>
<th>% Influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning Outcomes</td>
<td>57%</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>31%</td>
</tr>
<tr>
<td>Transition</td>
<td>7%</td>
</tr>
<tr>
<td>Age Inappropriateness</td>
<td>4%</td>
</tr>
<tr>
<td>Social Category</td>
<td>1%</td>
</tr>
</tbody>
</table>

- System to randomly allot 4-5 predicted dropouts per Teacher in each School.
- Such teachers, to closely begin academic mentoring of their allotted students.
- To gather contact numbers of the parents of their assigned students, reason for dropping out in case a student discontinuing in that school and record them on in Mobile App.
- State level authorities to send SMS, make calls etc to such Parents and Teacher-Mentors to encourage them at regular intervals.

Vidyarthi Nestham - Proactively identifying potential dropouts and involving teachers to mentor students and their parents to improve retention.
3. Improving Access to Digital Resources Via., Diverse Mediums

- 2358/5000 digital classrooms
- 4000 virtual classrooms
- 48 google future classroom labs
- 1.43 Lakh teachers on APeKX
- 70 lakh energized textbooks - AP instance of DIKSHA
Leverage Technology for Empowerment and Professional Development of Teachers to Ensure Better Student Learning Outcomes

Text Books Mapped and pooled for QR Codes

- Grades: 6th to 10th
- Subjects: All Non-Languages
- Mediums: English and Telugu
- QR codes identified and imposed: 4,065

<table>
<thead>
<tr>
<th>Subject</th>
<th>No of QR Codes</th>
<th>No of QR codes given with content</th>
<th>% of Complete</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social</td>
<td>1408</td>
<td>1388</td>
<td>99</td>
</tr>
<tr>
<td>Science</td>
<td>392</td>
<td>388</td>
<td>99</td>
</tr>
<tr>
<td>Physics</td>
<td>664</td>
<td>658</td>
<td>99</td>
</tr>
<tr>
<td>Maths</td>
<td>950</td>
<td>934</td>
<td>98</td>
</tr>
<tr>
<td>Biology</td>
<td>651</td>
<td>645</td>
<td>99</td>
</tr>
<tr>
<td>Total QR Codes</td>
<td>4065</td>
<td>4013</td>
<td>99</td>
</tr>
</tbody>
</table>

- Online courses are created for teacher professional development
- 10,000 teachers targeted to complete 20% of a course by end of July
- Training needs being identified to create online courses for teachers
- Setting up e-Content cell for content pooling/creation and curation
Text Books Mapped and pooled for QR Codes

Grades: 6th to 10th
Subjects: English and Telugu, All Non-Languages

4,065 QR codes identified and imposed

- Online courses are created for teacher professional development
- 10,000 teachers targeted to complete 20% of a course by end of July
- Training needs being identified to create online courses for teachers
- Setting up e-Content cell for content pooling/creation and curation

Energizing Text Books

BRINGING TECHNOLOGY INTO TEXT BOOKS

FIRST TIME IN INDIA INTRODUCING ENERGIZED TEXT BOOKS

MAPPING

POOLING

CURATING

Available Online & Offline: Textbooks and digital resources can be used without internet connectivity
Available Everywhere: Mobile App, Desktop, Web browser, local CDN
Available Where Child & Teacher Need it: In school computer lab, on teacher's smartphone, at home on parent's smartphone

Fine Grained, Easy to Use: Every chapter, and every topic of every textbook, linked to easy to find resources
Different types of resources: Link to different types of resources like Videos, Simulations, Worksheets
Digital Resources to augment the textbook: APeKX - DIKSHA Infrastructure for Augmented Learning

SCANNING

PROJECTING

UTILIZING

Gear up to 21st Century Text Books - AP SCERT, CSE-AP, AMARAVATI.
<table>
<thead>
<tr>
<th>S.No.</th>
<th>Programme</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>TaRL (Teaching at Right Level-Quality Improvement Programme)</td>
<td>VZM, ATP &amp; Kurnool (7703)</td>
</tr>
<tr>
<td>02</td>
<td>ALA (Multi Grade Multi level Teaching)</td>
<td>1342 schools across the state</td>
</tr>
<tr>
<td>03</td>
<td>Government School intervention Programme (ISHA)</td>
<td>3000 schools</td>
</tr>
<tr>
<td>04</td>
<td>School Complex Trainings</td>
<td>1,20,000</td>
</tr>
<tr>
<td>05</td>
<td>Remediation Programm for Slow learners</td>
<td>107976</td>
</tr>
</tbody>
</table>
4. Data Analysis and Visualization

Integration of Analytics on CM CORE Dashboard
## Andhra Pradesh Student Amenities System

<table>
<thead>
<tr>
<th>Component</th>
<th>&gt; 80</th>
<th>60 - 80</th>
<th>&lt; 60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>93.2%</td>
<td>5.9%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Playground</td>
<td>80.7%</td>
<td>19.3%</td>
<td></td>
</tr>
<tr>
<td>Library</td>
<td>55.5%</td>
<td>44.5%</td>
<td></td>
</tr>
<tr>
<td>Student Furniture</td>
<td>25.4%</td>
<td>46.5%</td>
<td>28.1%</td>
</tr>
<tr>
<td>Teacher Furniture</td>
<td>54.9%</td>
<td>11.6%</td>
<td>33.0%</td>
</tr>
</tbody>
</table>

*Total Percentage*
- Green: > 80
- Light Green: 60 - 80
- Orange: 55 - 60
- Red: < 55
- Gray: No Data

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Digital Class Rooms - Usage Analytics

District Wise Usage Report for offline Multimedia Content (Average Time Spent)

Subject Wise Usage Report

Total Usage in Hours
### Centralised MDM Billing

<table>
<thead>
<tr>
<th>METRIC</th>
<th>EARLIER…</th>
<th>NOW…</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bill payment time</td>
<td>2 to 3 Months (avg.)</td>
<td>15 Days (Avg.)</td>
</tr>
<tr>
<td>Numbers</td>
<td>Inflated/wrong numbers of attendance and enrolment</td>
<td>Meals Taken/Attendance linked to Enrolment Database (SIMS) and eventually to Biometric</td>
</tr>
<tr>
<td>Person Hours Saved</td>
<td>80% of DEO/MEOs official Hours spent on MDM bill clearance</td>
<td>Saved 100s of hours put by DEO/MEO every month which will be utilised for MDM monitoring purposes</td>
</tr>
<tr>
<td>Bill payment status</td>
<td>Cook, Helpers, HM did not have any idea about the status of MDM bills</td>
<td>Complete transparency in bill status and amount through NIC app and SMS to stake holder at each stage</td>
</tr>
</tbody>
</table>

---

**MDM Monitoring**

- **Bill payment time**: EARLIER… 2 to 3 Months (avg.) | NOW… 15 Days (Avg.)
- **Numbers**: EARLIER… Inflated/wrong numbers of attendance and enrolment | NOW… Meals Taken/Attendance linked to Enrolment Database (SIMS) and eventually to Biometric
- **Person Hours Saved**: EARLIER… 80% of DEO/MEOs official Hours spent on MDM bill clearance | NOW… Saved 100s of hours put by DEO/MEO every month which will be utilised for MDM monitoring purposes
- **Bill payment status**: EARLIER… Cook, Helpers, HM did not have any idea about the status of MDM bills | NOW… Complete transparency in bill status and amount through NIC app and SMS to stake holder at each stage
# Key Partners of the Department of School Education

<table>
<thead>
<tr>
<th>Lead Partner</th>
<th>Thought Partner</th>
</tr>
</thead>
<tbody>
<tr>
<td>TATA TRUSTS</td>
<td>CENTRAL SQUARE FOUNDATION</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Leadership Development Partner</th>
<th>Teacher Accreditation Partner</th>
</tr>
</thead>
<tbody>
<tr>
<td>KAIVALYA EDUCATION FOUNDATION</td>
<td>CENTRE for Teacher Accreditation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Assessment Reforms Partners</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CSSL</td>
<td>AMAGRA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technology Partners</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>APOonline</td>
<td>Vassar Labs</td>
</tr>
<tr>
<td>ANDHRA PRADESH Centre for Financial Systems and Services</td>
<td>Microsoft</td>
</tr>
<tr>
<td>GeoITAnalytics</td>
<td>U-Sky</td>
</tr>
</tbody>
</table>
Impact-1
Compared to NAS 2014, Andhra Pradesh has improved significantly in its rank in all Classes and subjects

<table>
<thead>
<tr>
<th>Grade</th>
<th>Subject</th>
<th>Rank 2014/15</th>
<th>Rank 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>3rd (NAS 2014)</td>
<td>Language</td>
<td>17</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Maths</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>5th (NAS 2015)</td>
<td>Language</td>
<td>14</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Maths</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>8th (NAS 2014)</td>
<td>Language</td>
<td>20</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Maths</td>
<td>26</td>
<td>7</td>
</tr>
</tbody>
</table>

Sources: NAS 2014 (grade 3rd, grade 8th); NAS 2015 (grade 5th)
Impact -2

• School Education Portal is a one-stop shop for all stakeholders in Education

• **Rationalisation of Schools** – quick decision support for rationalisation along with data based on GIS Coordinates

• **Duplicate/double enrolment/absentees** removals as a consequence of integrated data systems presents an accurate picture of Student enrolment

• **Removal of duplicates and its impact on**

  ✓ **Text Books**  Indenting, Printing and Distribution: Rs. 27.44 crores saved in text books printing; impact on environment

  ✓ **e-Hazar**: 100% Aadhaar seeding helped remove duplicates and start Aadhaar Enabled Biometric Attendance System enabling seamless integration with national portals

  ✓ Huge budgetary savings in **MDM** due to integrated data systems
Impact - 3

- Cross validations enabled: Using single source of data for UDISE updation

- **Integration & Inter-Departmental Convergence**— Data handshake and synergy with:
  - **Civil Supplies** Department’s ePOS System, for rice distribution
  - **Social Welfare, Tribal Welfare and BC Welfare Departments** for conduct of **Gnana Dhaara** – Summer Residential Remedial Programme to select students of Class 6 and Class 10 students and
  - **Dept of WD&CW** to integrate Anganwadi Teachers data

- Access of all education related metrics for **efficient, effective and timely decision-making**
Awards Achieved

Skoch Award

CSI-Nihilent Award
Moving Ahead…
Moving Ahead…

• **Integration with e-Pragati and Shaalakosh**
  • Data input and consumption at end user to be made easy through Mobile App
  • Adopt new modules from Shaalakosh framework
  • Aadhaar-based Online Admission and Online Transfer Certificate to reduce paperwork and track students

• **Online Teacher Training and Support System**
  • Generate a clear picture of all need-based Teacher trainings
  • Gather specific training needs requirement of individual Teacher
  • Streamline trainings & processes to improve quality of input and trainings
Moving Ahead…

• **GIS Dashboard** to identify targeted habitations/villages for development

• **Vidya Vikaasam – Learning Outcomes focus for quality**
  • Drive decision making through correlation of Student assessment of performance data to other data sets (teacher, school and drop out, etc.)
  • Dissemination of assessment results to all stakeholders till School point; share best practices and make school/subject specific improvement plans
  • Strategise, design and plan child development holistically and in partnership with all stakeholders for better Outcomes and Happiness
Thank You