It is the paramount duty of the state to make ample provision for the education of all children residing within its borders, without distinction or preference on account of race, color, caste, or sex.

The legislature shall provide for a general and uniform system of public schools.  

Washington State Constitution; Article 9, Sec. 1 & 2
Washington State Supreme Court

Decisions

Basic education includes the transportation of students to and from school.

- **Seattle School District v. State** – “...the constitution’s education article created a judicially enforceable affirmative duty, and a right on behalf of all resident children to have the state make ample provision for their education”; **1978**

- **Seattle School District v. State** – “…the programs established by the Legislature as necessary to meet the current needs of the children of this State as required by Article IX, Section 1” included (1) the program requirements in the Basic Education Act, …. and (5) some transportation services.”; **1983**

- **Program of Basic Education** – “Transportation and transportation services to and from school for eligible students as provided under RCW 28A.160.150 through 28A.160.180” **Revised Code of Washington (RCW) 28A.150.200**
The 1st Student Transportation Funding Model

Established in 1983 by the Washington State Legislature

- Payments based on # of students boarding the bus at each stop.

- Student counts were multiplied by distance weighting factors to generate weighted units.

- “Distance Weighting Factors” were included to adjust funding based on the RADIUS miles between bus stop and school destination.

- Weighted units were multiplied by the allocation rate (established by the legislature) to generate specific funding amounts.
Problems with Funding Model

Between 1983 - 2004 issues were noted with funding model

- In SY 2002-03 school districts total transportation expenditures = $321.1 M
- State allocation = $188.6 M
  - Funding an Avg. of 58.7% of district expenditures
- 290 school districts with transportation programs
- 139 districts w/ 84% of the state’s enrollment received 40 - 70% of their expenditures.

2006 - Joint Legislative Audit & Review Committee (JLARC)
Estimated underfunding for transportation was between $92.6 & $114.4 million and recommended a new funding methodology be developed because “the current method cannot generate funding that reflects each district's actual costs due to significant structural and implementation problems”. 
2006-2009

New Funding Formula Developed based on an Expected Cost Model utilizing GIS based variables including:

- **Network Road Mile distance** between Bus Stops and Schools
- School District **Land Area**
- School District **Road Miles**
2010-11 SY
Develop application to capture all data needed from school districts to implement new funding model
&
Train school districts to use the new system
The STARS application was developed for school districts to provide all the necessary data elements needed to calculate the expected allocation of student transportation funds under the new funding model.
Establish spatial databases and ArcGIS Server instances needed for the STARS application within OSPI’s existing application environment.
  - Development, Test, and Production environments
• Utilize ESRI’s Premium Street Map data for network analysis service to calculate network distances between each bus stop and school destination.
  - Quarterly updates to this data will provide best way of accurately calculating bus stop-destination distances in developing areas of the state.
GIS Infrastructure

Web Server
Windows 2008 R2 & IIS7

ArcGIS Server 10.0 (Load Balanced)

ArcSDE/SQL Server 2008 database

STARS
GIS Infrastructure
.NET application utilizing Silverlight menus and controls.

ArcGIS Server Silverlight API web mapping application to allow school districts to view, edit, and create bus routes within the browser.

School districts access via secure username and password using HTTPS.

School districts upload school bus route data via established XML and/or Excel formats.

School districts enter other data (i.e. student counts, district car mileage, etc.) via web forms.
STARS - Web Mapping Application
STARS – Web Mapping Application

Bus Route Details
STARS – Web Mapping Application
STARS - Web Mapping Application

Assign Students to Stops
STARS - School District Data
School District Information

Student Transportation Allocation Reporting System

Update Student Data - Spring 2011-2012
Aberdeen

Basic Program Students
- On School Buses: 1,268
- minus Bussed - In Walk Area: 0
- plus On Transit Buses: 0
- Total: 1,268

Special Program Students
- Special Education: 52
- Early Education: 234
- Bilingual: 0
- Gifted: 0
- Homeless: 10
- Total: 296
STARS – New Funding Model Results

Data Analysis Results

- **Expected Cost Model**
  (Regression Analysis using SPSS)
  - Mid-Day Kindergarten Trips & District Roadway Miles **not** Statistically Significant
- **Additional Coefficients**:  
  - **Students Per Road Mile** & **Students Per Square Mile** determined to be Statistically Significant and will be included next year.

- **Efficiency Model**
  (Data Envelopment Analysis using Excel Solver Pro)
  - School Districts best analyzed by quartiles based on student count (<217, 217-826, >826-3,192, >3,192)
  - **192** Districts at 100% Expenditure Efficiency
  - **189** Districts at 100% Bus (Resource) Efficiency
STARS – New Funding Model Results

Transition Year Funding

2011-2012 SY

- Transition Starting Point: $258.4 million
- Additional Funds $4.2 million
- Total = $262.6 million

STARS Calculated Funding

$360.3 million

Total Underfunding Statewide
~$110 million

Fiscal Year Difference
~$88 million
Student Transportation Routing Software

- 70 school districts create bus routes w/ routing software
- Many districts (225) can’t afford the cost to purchase or maintain in the software
- Routing software is not GIS Based and cannot perform other mapping functions.
- Districts must periodically pay to update georeferenced basemaps within the software (~$5-$10K)
STARS
Web Mapping Application

A School District's Alternative to Routing Software
STARS - Web Mapping Application

Create New Bus Routes

Form Based and Map Based Route Creation
Create Routes Form

Enter Stop Lat/Longs

Choose Route Type

STARS – Web Mapping Application
Create New Bus Routes
Create Routes Form
Create New Bus Routes

Create Routes Form – View Saved Route on Map
STARS - Web Mapping Application

Create New Bus Routes

Create Routes on the Map
Create New Bus Routes
Create Routes on the Map
Create New Bus Routes
Create Routes on the Map

STARS - Web Mapping Application
Create New Bus Routes

Choose Schools

Right Click & Add School

Search for School
Create New Bus Routes
Create Routes on the Map
Assign Stops to Schools
Save New Route

STARS - Web Mapping Application
STARS - Web Mapping Application

Instantly View New Route on the Map
STARS – Web Mapping Application

Future Development

- Transition to ArcGIS for Server 10.1 (prior to 2012-13SY)
- Implement geoprocessing service for enhanced print functionality
- Develop and implement geocoding/reverse geocoding widget for districts to search for and add stops via address or lat/long from the map
- Add additional map layers to application (one-road mile areas)
- And ....