IS THERE A CASE FOR CHANGE TO THE MONTANA EDUCATION SYSTEM?

JOINT EDUCATION INTERIM COMMITTEE EDUCATION INTERIM BUDGET COMMITTEE

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Why Do We Have the System We Have?

The current education system has its roots in the turn of the century – The 20th Century!

- Prepared workers for a burgeoning assembly line factory model
- Assimilated immigrants into American culture
- Provided widespread basic literacy and numeracy
- Critical thinking necessary for only a select percentage
- Leveraged lessons from across Europe
How Has the Current System Performed?

Actually, quite well…for a long period of time

- For almost a century, the U.S. led the world in education attainment and quality
- Drove the biggest economy in the history of the world to ever new heights
- Fostered an explosion of the middle-class
- Backbone of a stable democracy
- Production engine that helped win 2 world wars
How Has the Current System Performed Recently?

*Revised assessment format

What We Spent; What We Got For It

Per Pupil Spending and NAEP 12 Grade Reading Scores, 1971 to 2012

*Revised assessment format
## Income Distribution: The Last Half Century

### Mean (Average) Household Income by Quintile and Top 5%

<table>
<thead>
<tr>
<th>Household Segment</th>
<th>2017 Mean Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bottom Quintile</td>
<td>$13,258</td>
</tr>
<tr>
<td>4th Quintile</td>
<td>$35,401</td>
</tr>
<tr>
<td>Middle Quintile</td>
<td>$61,564</td>
</tr>
<tr>
<td>2nd Quintile</td>
<td>$99,030</td>
</tr>
<tr>
<td>Top Quintile</td>
<td>$221,846</td>
</tr>
<tr>
<td>Top 5%</td>
<td>$385,289</td>
</tr>
</tbody>
</table>

Source: US Census Bureau, 2018
80’s, 90’s and 00’s: Global Economic Change

So what happened?

Low wage competition
- Low skill
- High skill
- All skill levels

Automation of jobs involving routine work

Vast extinction of low-skill, routine work jobs in high-wage countries
2013, Frey and Osborne conclude that 47% of U.S. jobs could be automated with existing equipment.

2017, McKinsey and Co. conclude that ~50% of global work activities can be automated with currently available equipment.

Demand for high-wage [high-skill] occupations will grow, while demand for middle-wage [middle-skill] occupations will decline.
40 years ago, there were plenty of jobs in high wage countries for high school graduates who were reasonably literate in language and mathematics.

Today, there are plenty of people in low-wage countries who are just as literate and plenty of machines that can do the work requiring that level of basic literacy that will do the work for much less.

New jobs will be created, but most of those jobs will require not just retraining, but a much higher and deeper level of education as well as targeted technical training.

Nations that fail to educate their students to levels of education previously enjoyed only by their elites will face increasing income inequality and decreasing political stability.

The forces at work are moving with increasing speed.
To What Extent is this True in Montana?

![Montana Monthly Job Openings and Hires](image)

From Montana Department of Labor and Industry: “Increasing consumer demand coupled with a shortage of available workers led to more job openings remaining unfilled, even after businesses made 27,000 hires during August.”
Montana’s Aging Population

Population > 65 has been growing, but the population < 65 has been relatively flat since 2000

Proportion of children expected to shrink as the state population is expected to grow around 1% per year

20% of Montana's workforce will retire in the next 10 years
Can Montanan’s Fill the Jobs
OF A FLOURISHING, HIGH-TECH INDUSTRY?

• Defined by BBER as “firms that make or sell high tech products, provide professional services or consulting related to high tech, conduct e-commerce, or engage in manufacturing using skilled labor”

• These jobs pay 59% more than average state earnings and raise wages 0.8% faster than the state average

• Forecast employment and revenue gains 7x higher than statewide growth rates

• In 2019, high-tech firms grew 9x faster than other sectors, generating $2.5 billion in revenues (an all-time high)

• But as skill needs become more sophisticated, will Montanan’s be able to continue to do the jobs needed?
But it’s about much more than economics …

1. Morality and ethics

2. Ability to deal as citizens with a wide range of highly complex existential issues

3. Much fuller development of those qualities that make us fully human

4. Ability to interact with a broad range of people all over the globe

5. Capacity and desire to preserve and defend freedom and democracy
So…What Do Young People Need to Compete in an A.I. World?

- Deep understanding of the core concepts underlying the disciplines—the big ideas
- Ability to apply those concepts and ideas to wide range of practical problems
- Full range of intrapersonal and interpersonal skills
- The moral and ethical grounding needed to make wise decisions
Potential Solutions - How the US Responded

REFORM AGENDA SINCE 1970’S

- More money (more than doubled over a period of 20 years)
- Lower class size
- School competition (charters and vouchers)
- Technology
- Tough test-based teacher-accountability systems
Our Competitors Had a Different Analysis

Rather than modeling their education system on a factory model, they modeled it on a professional working environment.

They started with the end in mind.

They analyzed their context and the global context.

They designed their entire education system as an engineer would to get the results they wanted.
Our Competitors Had a Different Analysis

Did not double down on the old model (inexpensive teachers; low standards); that model is designed to produce majority of graduates with little more than an 8th grade level of literacy.

Knew the jobs available to them would rapidly decline.

Needed to provide a world-class education to every single student - equitably and efficiently.

All of that required a whole new model.
Their Model vs. Ours

THE 2018 PISA RESULTS

- In reading...
  - 8 systems outscored the U.S.
  - 11 systems were statistically tied with the U.S.
  - 57 systems scored worse than the U.S.

- In mathematics...
  - 30 systems outscored the U.S.
  - 8 systems were statistically tied with the U.S.
  - 39 systems scored worse than the U.S.

- In science...
  - 11 systems outscored the U.S.
  - 11 systems were statistically tied with the U.S.
  - 55 systems scored worse than the U.S.

Source: OECD
<table>
<thead>
<tr>
<th>Year</th>
<th>Reading</th>
<th>Math</th>
<th>Science</th>
<th>Reading</th>
<th>Math</th>
<th>Science</th>
<th>Reading</th>
<th>Math</th>
<th>Science</th>
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</thead>
<tbody>
<tr>
<td>PISA 2000 (31)</td>
<td>3</td>
<td>9</td>
<td>7</td>
<td>20</td>
<td>14</td>
<td>16</td>
<td>7</td>
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<td>PISA 2003 (40)</td>
<td>9</td>
<td>23</td>
<td>16</td>
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<td>PISA 2006 (57)</td>
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<td>22</td>
<td>NA</td>
<td>5</td>
<td>12</td>
<td>NA</td>
<td>20</td>
<td>22</td>
</tr>
<tr>
<td>PISA 2009 (65)</td>
<td>9</td>
<td>23</td>
<td>18</td>
<td>16</td>
<td>12</td>
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<td>PISA 2012 (65)</td>
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<td>PISA 2015 (70)</td>
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<td>5</td>
<td>12</td>
<td>42</td>
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<tr>
<td>PISA 2018 (78)</td>
<td>8</td>
<td>30</td>
<td>11</td>
<td>11</td>
<td>8</td>
<td>11</td>
<td>57</td>
<td>39</td>
<td>55</td>
</tr>
</tbody>
</table>
In reading performance, average U.S. students are behind top-performing countries Canada, Finland, Estonia and Hong Kong by about half a school year. Students in China and Singapore are between 1.5 and 2 full years ahead of average U.S. students in reading.
In mathematics performance, average 15-year-old US students are more than a year behind students from the top-performing countries. Students in Hong Kong and Singapore are between 2.5 and 3 full years ahead of average US students in math while Chinese students are nearly four full years ahead of US students.

Montana ranks just slightly above national average on NAEP, so how does this suggest Montana would compare at a global level?
In science performance, average US students are around half a year behind students from the top-performing countries. Students in Singapore are about 1.5 and years ahead of average US students in science while Chinese students are nearly three full years ahead of US students.

According to data from PISA 2018
Low-performing students are those in the 25th percentile of performance. In Reading, low-performing students from many top-performing countries are around half a year ahead of low-performing US students. Low-performers in Singapore are 1.5 years ahead and Chinese low-performing students are almost 3 years ahead of low-performing students in the US.
Immigrant students in Canada and Hong Kong outperform immigrant students in the U.S. by about a year, while those in Singapore are almost 3.5 years ahead.
Students from the bottom quartile of socio-economic status in several top-performing countries are between half a year and a full year ahead of their counterparts in the U.S. while similarly disadvantaged students in China are more than 1.5 years ahead.
Students whose performance was among the 90th percentile (top 10 percent) in the U.S. in reading were almost a year behind the 90th percentile of students in Singapore and nearly 1.5 years behind those in China.
Just How Far Behind Is the Top Performing US Student in Mathematics?

According to data from PISA 2018

Students whose performance was among the 90th percentile (top 10 percent) in the U.S. in math were between half a year and 1.5 years behind their peers in Finland, Canada, Estonia, Poland and Japan. The 90th percentile of students in South Korea, Taiwan and Hong Kong were closer to 2 years ahead of US top-performers. And top-performers in Singapore and China were about 3 years ahead of their US counterparts.
Students whose performance was among the 90th percentile (top 10 percent) in the U.S. in science were about half a year behind top-performers in Finland, Estonia and Japan. Top-performers in Singapore performed about 1.5 years ahead of US top performers and China’s top-performers were more than two full years ahead.
How Viable is the American Dream?

This chart shows the percentage of students from the bottom quartile of socioeconomic status who perform at the top quartile of achievement – those who are “beating the odds.”

In a world where income does not impact performance, you would expect students from the bottom quartile of socio-economic status to form 25% of the top quartile of performers in any country. No country has yet managed that, but some have come close. In Hong Kong, about 17% of economically disadvantaged students are in the top quartile of reading performance.

In the US, only about 10% manage to beat the odds and perform at the top quartile of performance.
Per Pupil Expenditure by Country, 2015
Primary and Secondary Education, All Services

Source: OECD Education at a Glance, 2018
The NCEE Blueprint

- Effective Teachers and Principals
- Rigorous and Adaptive Learning Systems
- Equitable Foundation of Supports
- Excellence Equity Efficiency
Effective Teachers and Principals
Effective Teachers and Principals

Recruitment of a diverse and talented teaching profession with incentives to stay

Teacher preparation and induction that provide a strong foundation in content, pedagogy, and action research

Educator career progression that supports and rewards the development and sharing of expertise

Schools organized so teachers support one another to get better and to improve the whole school

Leadership development for principals to lead schools and systems effectively
Rigorous and Adaptive Learning System
Rigorous and Adaptive Learning System

Preschool aligned to K-12 to ensure all are ready to learn

Engaging curriculum that promotes deep understanding and assessment that measures the knowledge and skills students need to succeed

Early identification of struggling learners, and ongoing support and extra time to ensure they meet and exceed standards

Gateway at the end of compulsory education that leads to high-quality options

State-of-the-art CTE programs that credential students for jobs of the future
Equitable Foundation of Supports
Equitable Foundation of Supports

Pre- and post-natal financial and parenting support for new and expectant families

Financial, health and social services, and high-quality child-care for young children and families

Schools coordinate access to the health, mental health, social services and supports students need to be successful
Coherent and Aligned Governance
Coherent and Aligned Governance

- Highly capable, strategic, and coordinated leadership at all levels of the system
- Accountability systems with incentives and supports to perform well and innovate to reach strategic priorities
- Financial systems that distribute resources equitably and efficiently
- Ongoing benchmarking of successful systems to inform strategies
Questions:

- What is driving the recent teacher shortages across the country and here in Montana?
- Does Montana’s approach to assessment incentivize the teaching and learning necessary to develop 21st century skills?
- Despite some outliers on both ends, why do charter schools perform similarly to traditional public schools?
- Do we need to aim at different targets? Can we?
Strategic Objectives Questions:

• Do we agree that there is a compelling case for change that requires significant action?

• What knowledge and skills do we want our children to graduate with?

• How would our system need to be designed to yield those outcomes at scale?

• What are the biggest challenges to establishing such a system?

• What can we do to overcome those challenges?

• How would we measure progress towards establishing such a system and the outcomes we want?