

DELIVERY OF EDUCATION AND CHANGES NECESSITATED BY TECHNOLOGY AND GLOBAL ECONOMICS

CONTENTS

- NDCDE'S DELIVERY OF EDUCATION – PROCESS
- NECESSITY ANALYZED BY TECHNOLOGY / DELIVERY TYPE
- NECESSITY ANALYZED BY PURPOSE
- NECESSITY ANALYZED BY PROCESS
- RESULTS

Dr. Alan J. Peterson, State Director ND Center for Distance Education |
Legislative Management's Interim Education Funding Committee |
Senator Donald Schaible, Chairman



DELIVERY OF EDUCATION

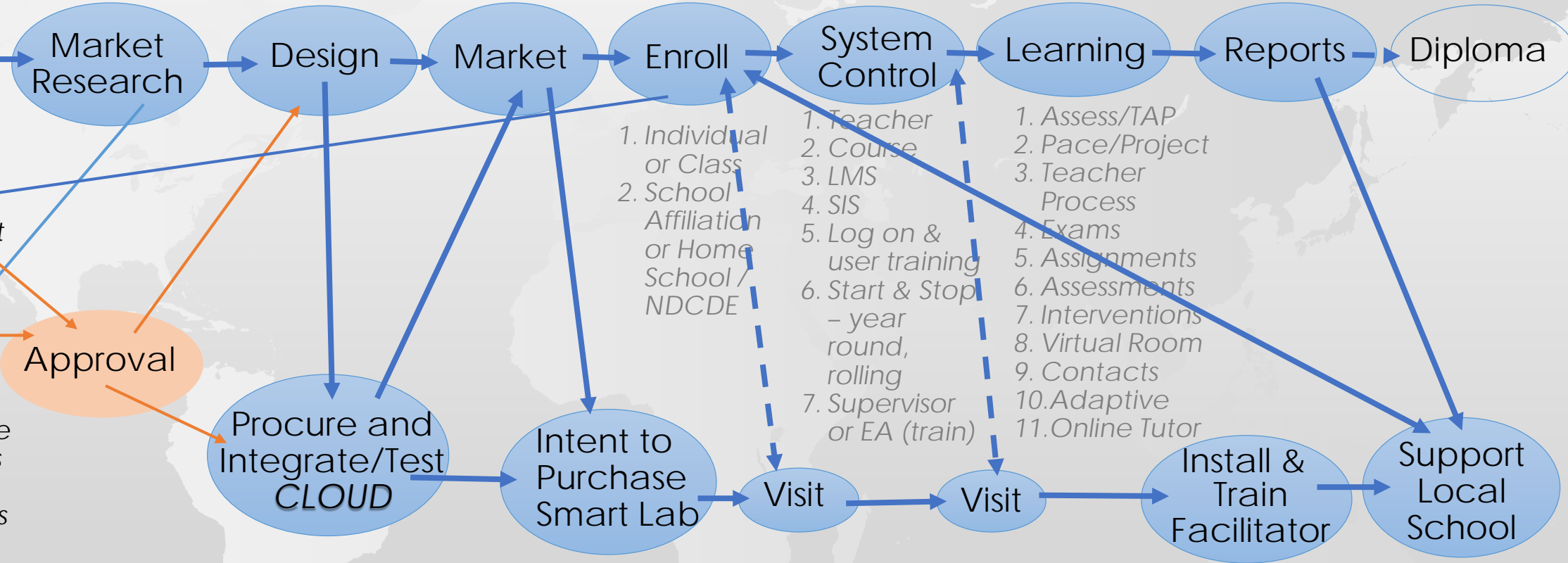
MAP OF A NDCDE'S DELIVERY SYSTEM

Customers

- Students
- Parents

Stakeholders

- Local School Admin
- School District Admin
- ND DPI
- ND CTE
- ESPB
- ND ITD
- ND ETC
- ND Legislature
- ND Taxpayers
- AdvancED
- School Boards
- Communities
- Businesses



FACTORS INFLUENCING NDCDE'S MODEL MAP

1. Funding Structure
2. Oversight
3. Status in State System
4. Customer Awareness
5. School Administration
6. Sustainability of Service

NDCDE's Integrated Products and Services

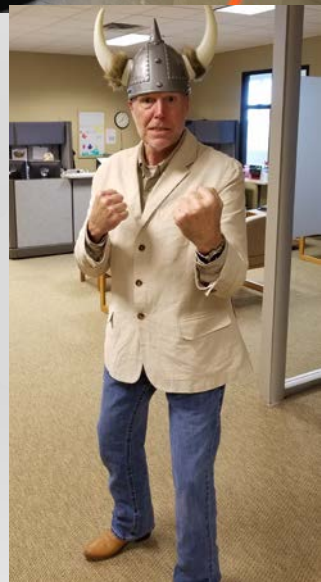
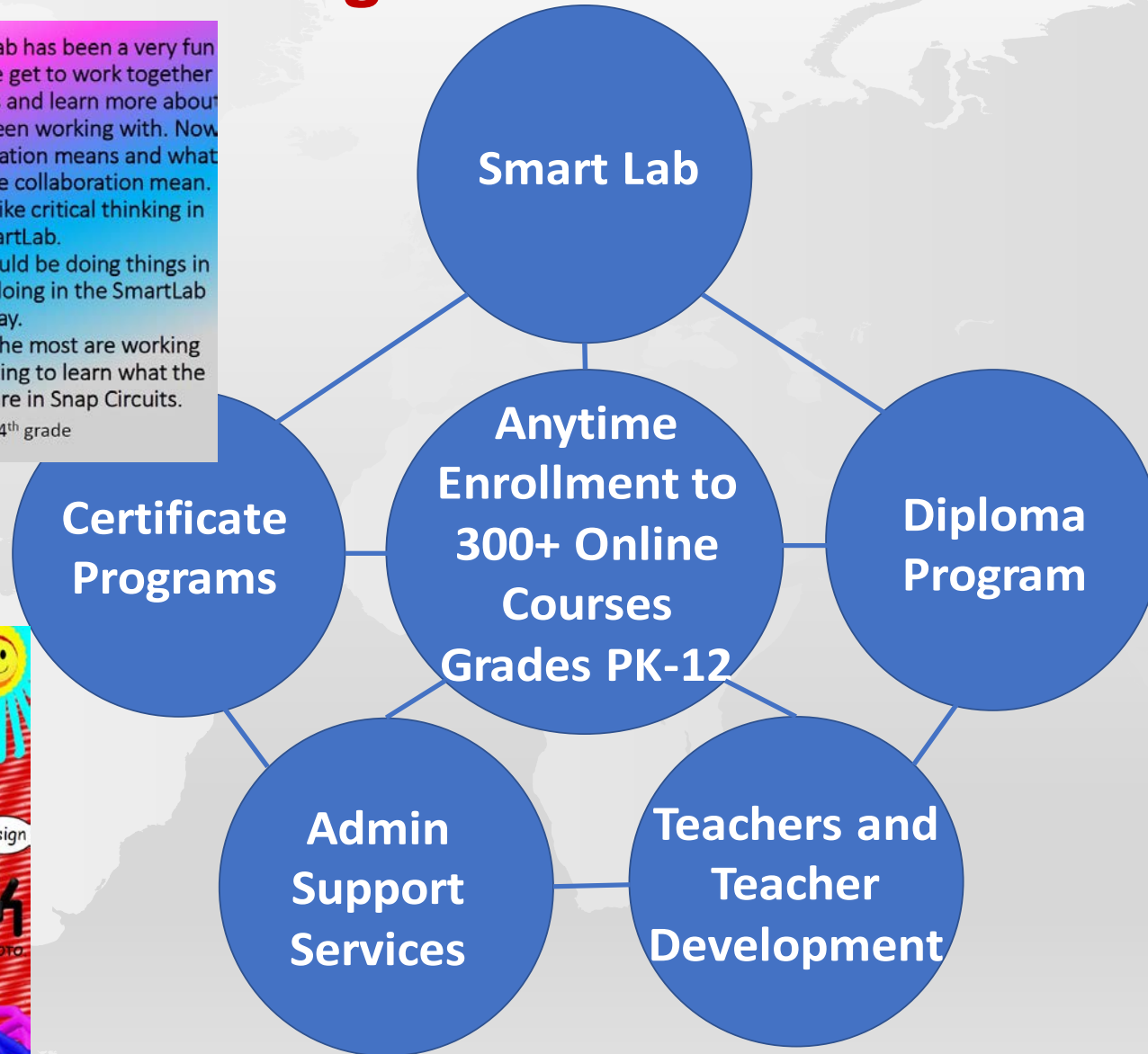


Learning in the SmartLab has been a very fun experience because we get to work together to build very cool things and learn more about people that you have been working with. Now we know what collaboration means and what a lot of other words like collaboration mean. We use lots of words like critical thinking in the SmartLab.

I never thought we would be doing things in 4th grade like we are doing in the SmartLab today.

The things that I like the most are working with partners and getting to learn what the names of the parts are in Snap Circuits.

Ivy 4th grade





ndCDE

DELIVERY

TECHNOLOGY

ANALYSIS BY COMPARISON OF HOW TECHNOLOGY IS APPLIED

IN 2017 THERE ARE ESSENTIALLY TWO TYPES OF EDUCATION DELIVERY:

1. Traditional and
2. Digital.*

*according to AdvancED school accreditation definitions.

BOTH CAN BE ENHANCED BY THE OTHER.

BOTH CAN BE ENHANCED BY A SMART LAB

TYPE	LOCATION	TIMING	TEACHER ROLE	CONTENT	TEACHER ACTION	TOOLS	COST	DRIVERS	BRAIN SCIENCE
TRADITIONAL *FACE-TO-FACE *ITV *TEACHER-LED DIGITAL	CLASSROOM	SCHEDULE	LEAD	TEACHER DESIGN TO STANDARD OR GROUP	INTERVENE BASED ON ASSESSMENT	*VOICE *PHYSICAL PRESENCE *MEDIA *SOFTWARE	\$11,000 / YEAR / STUDENT <i>(funding for all costs)</i>	TEACHER PARENT	FOCUS ON KNOWING AND SOME LEARNING SKILLS
DIGITAL *WITH TEACHER *WITH OTHER	ANYWHERE	PACE / PROJECT	COACH	PROVIDER DESIGN TO STANDARD	INTERVENE BASED ON ASSESSMENT	*VOICE *IMAGE *MEDIA *SOFTWARE	\$6,000 / YEAR / STUDENT <i>(funding for all costs)</i>	STUDENT PARENT	FOCUS ON KNOWING AND SOME LEARNING SKILLS
SMART LAB ADDED AS OPTION TO EITHER TRADITIONAL OR DIGITAL	DESIGNED CLASSROOM	SCHEDULE OR PACE OR PROJECT	FACILITATE	300 PROJECTS – SOFTWARE, SYLABI, PORTFOLIO, RUBRICS, AND BUILD KITS	INTERVENE BASED ON ASSESSMENT	*VOICE *PHYSICAL PRESENCE *IMAGE *MEDIA *SOFTWARE *KITS *PROJECTS	\$225 / YEAR / STUDENT <i>(funding for all costs; based on 5-year life of lab and full use)</i>	STUDENT TEACHER PARENT BUSINESS COMMUNITY	FOCUS ON LEARNING SKILLS THAT IMPACT BRAIN GROWTH AND CONTINUAL LEARNING



DELIVERY

GLOBAL ECONOMICS AND TECHNOLOGY

ANALYSIS BY PURPOSE

IN 2017 THERE IS A RECOGNITION IN NORTH DAKOTA AND THE WORLD THAT RESOURCES ARE FINITE. THIS RECOGNITION INCLUDES EDUCATION. RESPONSES TO RECOGNITION RANGE FROM DENIAL TO APOCALYPSE. A REALISTIC, 21ST CENTURY RESPONSE FOCUSES ON

1. **PURPOSE**
- AND
2. **PROCESS.**

PURPOSE – APPLICABLE TO ALL ORGANIZATIONS / SYSTEMS – THE PURPOSE OF ALL ORGANIZATIONS IS TO ADD VALUE.

ADD VALUE WHAT IS EXPECTED? OUR CAPABILITY? OUR VALUE STREAM?

REDUCE WASTE WHERE IS OUR VARIATION (REDO, REDUNDANT, DEFECT)? WHAT IS ITS CAUSE? WHAT IS ITS EFFECT? HOW DO WE FIX IT....PERMANENTLY?

INCREASE QUALITY WHAT ARE OUR CUSTOMERS' PERCEPTIONS? WHAT IS THE LEVEL OF OUR CUSTOMERS SATISFACTION?

CONTROL COSTS WHAT IS PURCHASED? WHAT IS MADE? WHAT IS COST VERSUS BENEFIT? WHAT IS THE RETURN ON INVESTMENT?

MANAGE LEARNING HOW IS LEARNING IDENTIFIED? HOW IS IT MAINTAINED? HOW IS IT ACTUALIZED? HOW IS IT MEASURED?

SUSTAIN IS THE DESIGN ROBUST? DOES THE PROGRAM DEPEND UPON FACTORS NOT IN EVIDENCE? LEADERSHIP'S CONSENSUS ABOUT VALUE?



DELIVERY

ndCDE

GLOBAL ECONOMICS AND TECHNOLOGY

ANALYSIS BY PROCESS

PROCESS – A SET OF INTERRELATED OR INTERACTING ACTIVITIES PLANNED AND CARRIED OUT UNDER CONTROLLED CONDITIONS WHICH TRANSFORM INPUTS TO OUTPUTS TO ADD VALUE.

- IDENTIFY PROCESSES** WHAT ARE YOUR PROCESSES? WHAT PROCESSES CONSTITUTE YOUR VALUE STREAM? HOW DO THEY INTERACT – OUTPUT TO INPUT? CAN YOU MAP YOUR PROCESS(ES)? WHO OWNS THE PROCESS? WHAT IS PROVIDED TO THE PROCESS? HOW IS THE PROCESS ACCOMPLISHED? HOW IS THE PERFORMANCE OF THE PROCESS MEASURED? RESPONSE TO MEASURE?
- GAPS AND CORRECTIONS** WHAT ARE THE GAPS? DO THEY NEED TO BE FIXED? WHO WILL FIX THEM? WHAT IS NO LONGER APPLICABLE? WHAT OUTCOMES ARE SUB-STANDARD?
- CONTROL** WHAT CONSTITUTES STABILITY FOR EACH PROCESS? THE SYSTEM? DO CURRENT MEASUREMENTS PROVIDE CRITICAL MEASURES OF PERFORMANCE TO ENABLE ASSESSMENT AND CORRECTION?
- LEAN** HOW DO WE CUT OUT WASTE WITHOUT DAMAGING QUALITY? HOW DO WE CUT OUT WASTE AND INCREASE QUALITY?

CAUTION: YOU WILL NEED TO RECOGNIZE THAT SYSTEMS / ORGANIZATIONS WILL HAVE 2 CONSTANT TUGS-OF-WAR – 1) EFFECTIVENESS VS. EFFICIENCY, AND 2) INCREMENTAL CHANGE VS. INNOVATION.

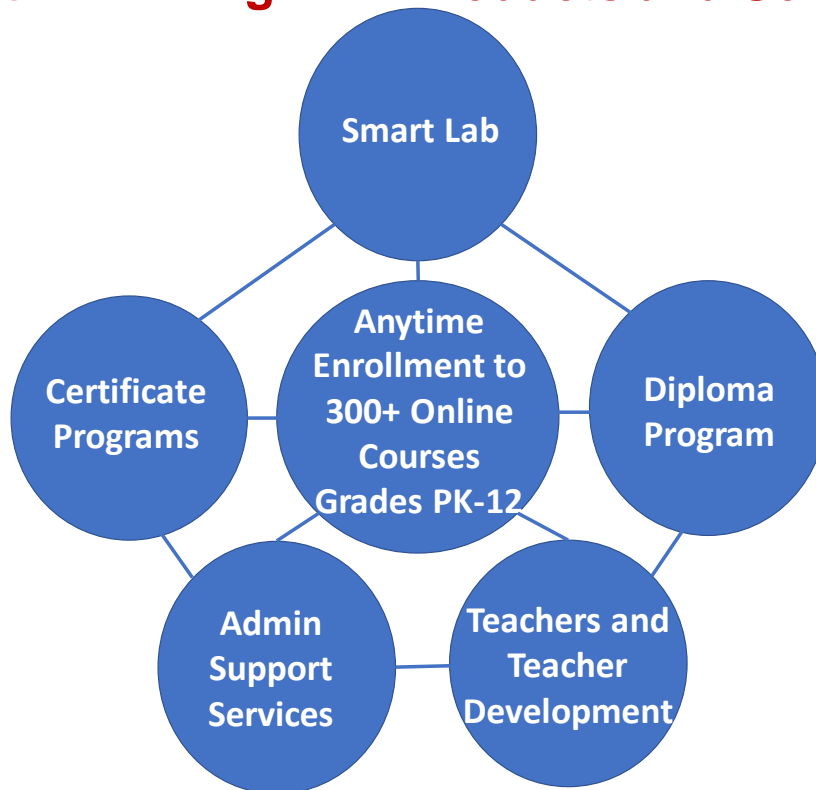


RESULTS

NDCDE'S TECHNOLOGICALLY-SUPPORTED PROCESS-BASED SYSTEM

- Courses delivered to all 175 ND school districts.
- Course completion rate of 96%.
- Student dropout rate of less than 5%.
- Student failure rate of less than 4%.
- Customer satisfaction rating of 3.65 (4 scale).
- An online school consistently ranked in the top 10 online schools in the US (#5 2016).
- 3,000 ND students enrolled in at least 2 courses per year.
- An estimated 350 students experiencing STEAM, project-based, hand-on learning each day in SMART Labs installed and supported by NDCDE (this will increase to an estimated 1225 students per day in 2017/18).
- 320 courses for students to select from, including AP courses, credit recovery courses, advanced courses, dual credit courses, technical courses, core courses, elective courses, Ag courses and aviation courses.
- All services and products developed, leased, purchased, controlled, improved and delivered by NDCDE are done so for \$3,000,000 General Fund dollars and \$1,500,000 Special Fund dollars per year.
- Credits earned by students cost approximately half at NDCDE compared to an average ND brick and mortar school.
- Deliver a total of 5,500 courses per year; 11,000 courses over the biennium

NDCDE's Integrated Products and Services



Mission

ND Center for Distance Education's mission is to ensure that all North Dakota K-12 students regardless of location, have access to educational opportunities that meet or exceed expectations for:

- the quality of curriculum,
- ongoing contact with highly qualified teachers,
- the selection and use of suitable educational technology,
- monitoring of course delivery efficiency and effectiveness, and
- student learning.

Purpose

To provide North Dakota's K-12 students:

- Choice (*of courses, learning methods, pace of completion, career exploration*),
- Opportunity (*to experience learning situations useful and relevant to them*), and
- Validation (*of their unique skills, talents, capabilities and personhood*).

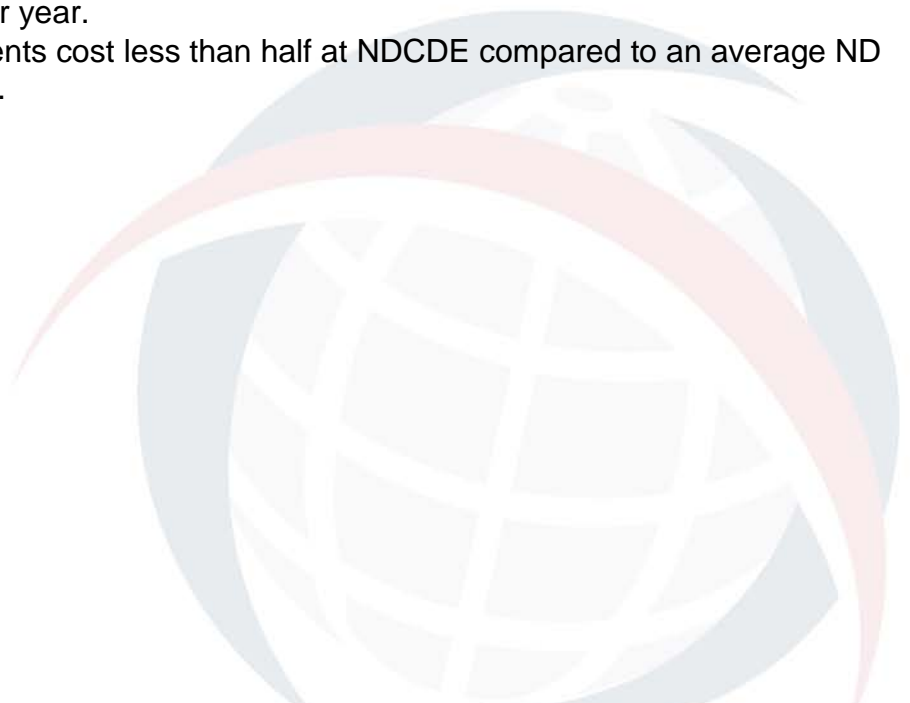
Focus

Engage students in the building of those skills that measurably impact brain function and skills that are necessary to learn, change, improve and be useful. Those skills are:

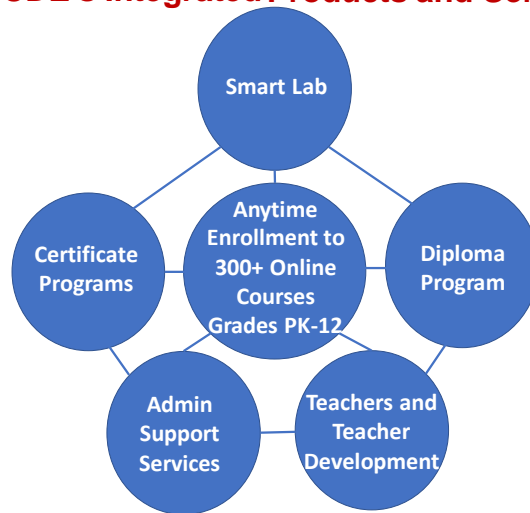
- Problem Solving,
- Critical Thinking,
- Collaboration,
- Communication,
- Technical Literacy,
- Informational Literacy,
- Design Principles, and
- Ownership.

Results

- Courses delivered to all 175 ND school districts.
- Course completion rate of 96%.
- Student dropout rate of less than 5%.
- Student failure rate of less than 4%.
- Customer satisfaction rating of 3.65 (4 scale).
- An online school consistently ranked in the top 10 online schools in the US (#5 2016).
- 3,000 ND students enrolled in at least 2 courses per year.
- An estimated 350 students experiencing STEAM, project-based, hand-on learning each day in SMART Labs installed and supported by NDCDE (this will increase to an estimated 1225 students per day in 2017/18).
- 320 courses for students to select from, including AP courses, credit recovery courses, advanced courses, dual credit courses, technical courses, core courses, elective courses, Ag courses and aviation courses.
- All services and products developed, leased, purchased, controlled, improved and delivered by NDCDE are done so for \$3,000,000 General Fund dollars and \$1,500,000 Special Fund dollars per year.
- Credits earned by students cost less than half at NDCDE compared to an average ND brick and mortar school.



NDCDE's Integrated Products and Services



Online Course Delivery

- NDCDE applies a rolling enrollment, asynchronous approach for course delivery. That means a student can enroll at any time of the year. Once enrolled, the student's engagement with the course is managed by a teacher who is highly qualified and who has been trained to carry out NDCDE's Teacher Process. NDCDE's Teacher Process is a series of standard practices applied by each NDCDE teacher. The standard practices are formulated in response to expectations of parents and students, and reflect requirements and standards, as prescribed by state statute, Department of Public Instruction rules, AdvancED accreditation standards, and any other applicable expectations of sanctioned governing bodies.
- NDCDE provides a complete curriculum for grades 5-12 and provides support curriculum and experiences for K-4.
- A complete listing of all online courses can be viewed at www.ndcde.org.
- Courses are supported by NDCDE teachers. For purposes of quality learning, NDCDE teachers are assigned no more than 120 students at a time.
- Courses are also available designed to be supported by a teacher contracted by a local school. Class Only, Local Teacher (COLT) are NDCDE online courses that are available to be taught by local teachers. NDCDE does all support. The local teacher provides the student teacher interface.
- CLEM – College Lab for English and Math is a course that provides pre-college remediation in English and Math. It is a course that uses the latest technologies to assess and direct a student along an individualized learning path that continues to adjust to the student as the student progresses through the program.
- NDCDE partners with over 15 course providers to obtain the best courses at the best prices.

Diploma Program

- NDCDE is authorized to award high school diplomas to students who have completed at least 25% of their grades 9-12 credit requirements at NDCDE and who meet all other ND graduation requirements.
- The diploma program is available to adult students.
- NDCDE has a full-time student counselor on staff to assist students and their parents set up individualized diploma program plans.

Teachers and Teacher Development

- NDCDE employs 15 full-time teachers and accesses up to 25 part-time teachers. 65% of NDCDE teachers have advanced degrees.
- NDCDE applies an online competency-based program to prepare and maintain its teachers to be successful in an online learning environment.
- Other Teacher Development opportunities for both NDCDE and non-NDCDE staff include:
 - Four college-credit courses providing professional development for any teacher interested in gaining or improving their online instruction skills.
 - Facilitator training provided to individuals selected by schools installing a NDCDE SMART Lab.
 - Supervisor training for individuals selected by local schools to be the local learning coach (in the cases where NDCDE is teaching an entire classroom of students at a local school).
 - Examine Administrator training for individuals selected by schools to be the overseer of a student individually enrolled in one or more NDCDE course. The key responsibility is access to exams and the proctoring of exams.
- Teachers who work full-time for NDCDE are provided funding support to pursue required professional development.

Admin Support Services

- Internally NDCDE is supported by a fully integrated digital system that is comprised of a Learning Management System (LMS), a Student Information System (SIS), a business system, an enrollment system, a store/payment system, as well as integration with cyber security services and practices, and full access to the PeopleSoft and EmpCenter (ND state government) applications.
- Customers can call or simply go online to enroll in an NDCDE course.
- NDCDE supports other organizations provide LMS, SIS and enrollment services. The charge is minimal and is much more cost effective in many cases than individual organizations purchasing their own license for the services.
- Beginning in 2017 NDCDE is adding two additional support services for schools, parents and students
 - Clearinghouse of online courses – NDCDE will publish a consumers' guide / clearinghouse of online courses available to ND customers.
 - Registration of online courses – NDCDE will provide all schools in ND with a complete list of its courses and will provide the means to assist schools make the courses part of its course registration process.

Certification Programs

- Besides the internal teacher online certification program, NDCDE is investigating the application of individual certificates. The concept is, of course, a very current topic in 2017. Certifications are all about competency, and competency represents a trend that has taken a dominant position in the hiring of new employees. CDE is gaining experience in several areas of competency and mastery-based learning via the SMART Lab which is a project-based, portfolio tracked, journal recorded, and self and instructor evaluated learning environment.
- A recent example of mastery-based learning achieved by way of NDCDE is the Girl Scouts partnering with NDCDE's SMART Lab to earn certain merit badges.
- Future development currently being explored (several are close to being approved):
 - Pilot's license
 - Drone license
 - Certain computer programming and applications certificates
 - Certain technical skills functionality tests and certifications.

SMART Lab

- The SMART Lab is a turn-key learning environment that any ND school can request NDCDE to install. The SMART Lab comes with over 300 fully supplied projects in 3 levels of difficulty that are used to provide K-12 students project-based, hands on learning every day. The SMART Lab can be used by a school to provide students learning experiences in addition to their other courses, as well as courses taught entirely in the Lab. For example, high school students can earn multiple credits for multiple technical courses in the SMART Lab.
- The label SMART refers to the SMART goal-setting many businesses, industries and organizations of all kinds apply every day.
- The SMART Lab can be used to support STEM or STEAM programs, but it is not limited to those tracks only. A SMART Lab has a full digital production studio, electronic music capability, and digital photography features.
- SMART Labs come in sizes and configurations for 6, 12, 18, 24 and 30 students.
- SMART Labs, due to NDCDE's involvement with designers and producers of the SMART Lab, range in price from \$35,000 to \$95,000. A SMART Lab purchased directly from Creative Learning Systems start at \$200,000.
- To make the Labs even more affordable for ND schools, NDCDE has secured a state-approved loan agency able to offer financing to ND schools for up to five years at a very low interest rate.
- Installation, training of Lab facilitators, and ongoing support are all provided by NDCDE.
- The projects are continually being upgraded, as well as the computer software that supports them. For example, in 2017 a drone simulator, complete with an actual drone will become available to SMART Lab owners.

Additional, Product and Service Capabilities

The following capabilities are byproducts of NDCDE's development efforts related to its current products and services. Each description listed below would most accurately be described as a consulting service or product. Each has potential for routine use, but currently each represents expertise developed by NDCDE, and is applicable through NDCDE subject matter experts (SME's).

Design and Development of Digital Teaching/Learning Systems for Small Schools

NDCDE has rebuilt its infrastructure from the ground up in the past 6 years. Besides internal expertise and learning, NDCDE has utilized several organizations and/or consultants to design, develop and build its teaching and learning infrastructure. NDCDE has informally assisted several schools and individuals design and/or redesign their systems. This listing is provided to inform North Dakotans that NDCDE has developed this capability.

Gap Analysis of a School's Learning/Teaching Technology

This service is used as part of the service described above; or it is a service that can be applied individually. The Gap Analysis uses as its standard the capabilities that could be achieved by the school with its current capabilities combined with available NDCDE resources.

Assistance for When to, and How to, Outsource Teaching/Learning Technology

When to purchase, and when to make, are now fundamental decisions important to schools. NDCDE has developed guidelines that it uses to make decisions about the 'buy or make' decision. One example specific to schools in North Dakota, is whether to design and build a project-based learning lab or buy or turnkey solution like the ND Smart Lab.

Process-based Systems Management for Schools

Organizations worldwide have shifted from hierarchical management systems that are arranged and driven forward by the dynamics provided by power and position, to a process-based approach that focuses on results from competent performance. NDCDE is a case study supporting the worth of process-based management, a management system sometimes associated "business" and therefore assumed to be nonapplicable to education, to an educational system. NDCDE can help a school move to a process-based system.

Developing a Navigable, Online, Documented System using Sharepointe and OneNote

Learning management is an organization is enhanced if the policies, procedures, processes, forms, instructions and records important to the system are readily accessible to the members of organization when needed. A well-designed and computer-supported system is something that NDCDE has put in place. NDCDE can demonstrate its system to an organization and provide support to an educational or governmental organization wishing to develop its own an online, navigable documented system.