Mercer Island School District #400
Board of Directors Meeting

May 28, 2015

WORK AND DELIBERATION

Monitoring of Fundamental 5 – *Cultivate and Foster Thinking and Process Skills*

Fundamental 5: Cultivate and foster thinking and process skills such as analytical and critical thinking, cross-discipline thinking, creativity, innovation, collaboration, communication, problem-solving, and information and technology literacy in curriculum design.

BACKGROUND AND FACTS:

The administrative team is committed to implementation of the 2020 Vision including the six fundamentals. The following will explain the work being done in our schools to meet Fundamental 5 – *Develop 21st Century Thinking and Process Skills*.

The leadership team considered the superintendent's interpretation of Fundamental 5 and based on the interpretation supported by the board, the monitoring is divided around four themes:

Theme 1: Analytical and Critical Thinking, Cross-Discipline Thinking and Problem Solving
Theme 2: Creativity and Innovation
Theme 3: Communication and Collaboration
Theme 4: Information and Technology Literacy in Curriculum Design

The following indicators represent quantitative and qualitative data that is already being collected to support the monitoring of Fundamental 5.

QUANTITATIVE INDICATORS

Numerous quantitative factors from the Educational Effectiveness Survey (EES) were considered to highlight implementation of Fundamental 5. Significant revisions and additional questions were made to the EES during the 2012-13 and 2013-14 school years. All the questions used as indicators were a result of these revisions and additions.

Theme	Indicator	SY 10-11	SY 11-12	SY 12-13	SY 13-14	SY 14-15
Theme 1 – Analytical and Critical Thinking, Cross-Discipline Thinking and Problem Solving	% 4th and 5th grade students who agree that "I am good at figuring out the best solution to problems I'm facing."	*	*	*	79	74
	% secondary students who agree that "I am good at figuring out the best solution to problems I'm facing."	*	*	*	72	74
	% 4th and 5th grade students who agree that "I solve problems by first breaking them into smaller steps."	*	*	65	73	57
	% secondary students who agree that "I solve problems by first breaking them into smaller steps."	*	*	58	66	56
	% 4th and 5th grade student who agree that "When my solution to a problem is not working, I try to figure out what went wrong."	*	*	*	87	81

	% secondary student who agree that "When my solution to a problem is not working, I try to figure out what went wrong."	*	*	*	79	78
	% elementary staff who agree that "Students are provided tasks that require higher-level thinking skills."	*	*	63	64	69
	% secondary staff who agree that "Students are provided tasks that require higher-level thinking skills."	*	*	68	64	66
	% of teachers on Comprehensive Evaluation rated proficient or distinguished in Danielson's component 3c "Engaging Student in Learning"	*	*	*	89	NA
Theme 2 – Creativity and Innovation	% 4th and 5th grade students who agree "I try to think of many solutions when I have a problem"	*	*	*	82	77
	% secondary students who agree "I try to think of many solutions when I have a problem"	*	*	*	70	73
	% 4th and 5th grade students who agree that "I am a creative person."	*	*	*	92	89
	% secondary students who agree that "I am a creative person."	*	*	*	77	78
	% 4th and 5th grade students who agree that "I can come up with new ideas."	*	*	85	93	86
	% secondary students who agree that "I can come up with new ideas."	*	*	79	81	84
	% 4th and 5th grade students who agree that "I like to imagine new ways to do things."	*	*	*	87	81
	% secondary students who agree that "I like to imagine new ways to do things."	*	*	*	74	74
	% of teachers on Comprehensive Evaluation rated proficient or distinguished in Danielson's component 3e "Demonstrating Flexibility and Responsiveness"	*	*	*	94	NA
Theme 3 – Communication and Collaboration	% 4th and 5th grade students who agree that "My teacher(s) help us learn in more ways than just talking in front of class."	*	*	*	88	83
	% secondary students who agree that "My teacher(s) help us learn in more ways than just talking in front of class."	*	*	*	64	67
	% of teachers on Comprehensive Evaluation rated proficient or distinguished in Danielson's component 3b "Communicating Clearly and Accurately"	*	*	*	83	NA

* Question not asked during the specified timeframe
NA – Not Available - Data not yet available for current school year

These data show that teacher are working on experiences for students that involve critical thinking, problem solving, creativity, innovations and communication and collaboration and teachers are supporting their students with engaging learning environments, clear communication, flexibility, and responsiveness. Of particular note is the number of students who agree "I am a creative person" (89% and 79%) and "I like to imagine new ways to do things" (81% and 74%).

QUALITATIVE INDICATORS:

The following qualitative data provides snapshots into Fundamental 5 – Develop 21st Century Thinking and Process Skills. Several but not all will be highlighted at the May 28, 2015 board meeting.

Theme 1: Analytical and Critical Thinking, Cross-Discipline Thinking and Problem Solving

- **IP 21 Acres Learning Center experience** – In conjunction with their science nutrition unit and social studies focus on Washington state regions and resources, fourth grade students visit 21 Acres Learning Center in Woodinville, WA. There, they study the agricultural heritage of our region, learn about sustainable agricultural design and technologies, and explore ways to maximize the beneficial aspects of fresh local produce and farm products. Utilizing the center's commercial kitchen the students learn about the economics of small farms, conservation systems that support them, and how to help their families cook healthier meals. Students plan and prepare a healthy meal, review composting procedures and examine other green principles.

- **Elementary Interdisciplinary Unit** - iPADS and science: Use of technology to create student ownership of concepts in science. Tom Tivnan and Chris Cocklin-Ray have students using the program Green Screen to produce videos to teach and learn about the solar system and flight. Each child is responsible for a particular idea (Saturn, gravity, thrust). The student uses the green screen to create a video about that idea, complete with learning goals. Students vetted each other's videos to check for accuracy. Students then presented to their home class and then to the opposite class. Covered in this project;
    - technology (the big buy-in for students)
    - reading for information-both books and internet
    - research on the internet of current science sources
    - writing (and public speaking) a script
    - creating a storyboard to sequence the video
    - assessment-in the form of the video, and summative in a quiz for which each student has written a question

- **Elementary Rigor in Questioning and Task** – Elementary: Teachers have been applying their learning from 2014-15 about the Hess Rigor Matrix, and other tools for questioning, to strategically build questions at different levels of complexity and rigor, pushing students' thinking not only about key ideas in a text, but also about the author's craft and the structure of a text, and how they affect meaning. In the professional development for the K-2 Mondo ELA adoption, teachers engaged in learning and collaboration about ways to use leveled texts with students. Part of that work included considerations of rigor, and how the task surrounding a text can be altered to boost the cognitive demand in one group, while presenting a less demanding task for another group who need more scaffolded support. Teachers in 3-5 have applied these concepts of rigor to their work in writing, reading, and content area instructional planning.

- **Elementary and IMS Robotics Clubs –** Each year in December, FLL (First Lego League) sponsors a world-wide competition with four components based around a global situation. This year's theme was "World Class: Working on finding solutions for education". Teams (4-8th grade) built robots designed to solve situations related to the theme. They researched, interviewed, understood, planned, and proposed a solution to a community's possible problem - which they presented to a committee. They collaborated and presented themselves as a cohesive team throughout the competition, and finally they explained their designs of robotic functions to an engineering committee.

- **IMS Computer Programming**: All IMS students have multiple opportunities to utilize critical thinking and problem solving strategies though experiences involving computer programming. All 6th grade students are introduced to programming and a series of lessons around basic coding using the LegoEducation Mindstorms curriculum. This unit culminates with an independent project where students model a "real world" working machine. In addition, students in 7th and 8th grade can explore computer programming in our video game programming elective. IMS has also offered ancillary programs to students such as a Code Academy club and participated in Code.org's Day of Code in 2013 and 2014.

- **IMS 6th Grade Webquest:** Our sixth grade team recently finished one of our integrated units focusing on influences of ancient Greece. Each student chose one of these activities/area of interest – theater, board games, ancient temples, travel brochure or living museum. Working together in a group with like interests, students were asked to use teamwork skills to plan their research, create a schedule, develop and produce a creative product, and make a presentation. As they researched, students used technology as well as the library to find, evaluate and synthesize information that they determined was relevant to their topic. Each group needed to be able to communicate their learning to their teammates as well as the audiences of their peers and parents. The written portion of the unit included a daily reflection on progress towards the goals they set as well as an essay on the connections between

ancient Greece and current day based on information gained through research and other presentations. The unit combines the core disciplines of science, social studies, language arts and math in an exciting, engaging format.

- **HS AP Statistic Project:** The AP Statistics students will perform the Standard Field Sobriety Test: walking a straight line heel-to-toe using the Fatal Vision® Goggles purchased through a grant written by the Mercer Island Police Department. Due to the loss of balance and equilibrium produced by the goggles, the wearer will exhibit behaviors that are similar to that of someone under the influence of alcohol and other drugs. Prior to the lab, Chris Harnish will talk with the AP Statistics students about these effects; seems appropriate just prior to Prom.
  For the lab, MIPD Officer Art Munoz will conduct the initial test as authentically as possible. Then the students will walk a 10-foot line both with goggles and without the goggles. The order in which they do this will be randomized by the students using a coin toss. Before the project, they will make a hypothesis concerning how many times they deviate from the line with and without the goggles. While each student walks the line under both conditions, their partner will silently count how many times the subject strays from the line. After the data is collected, the AP Statistics students will conduct t-tests to determine the validity of their hypotheses.

Theme 2: Creativity and Innovation

- **Museum of Flight**: Fifth graders go to the Museum of Flight to participate in a simulation of space travel to Mars. Students must problem-solve their way to the red planet by accomplishing specific missions. This activity includes prior classroom preparation, in which students are divided into teams focused on Communications, Data, Navigation, Medical, Probe, and Life Support. Incorporating problem solving, decision making, communication, writing, math, and reading comprehension skills, students create a mission plan that is tested for effectiveness during the simulation.

- **Destination Imagination.** This extracurricular program takes place after school for interested students at elementary, middle, and high school levels. The purpose of the program is to "inspire and equip students to become the next generation of innovators and leaders." The program presents students with a Challenge to tackle over several weeks. With support from coaches, students learn to imagine and innovate solutions to their challenges. They work collaboratively with their teams to create, develop, and practice a solution to the challenge. They then compete in a local tournament, and, if successful, advance through tournament levels to the Global Finals. This year, two of our teams - one elementary school team, the Seven Sparks, and one middle school team, Sushi - advanced to the Global Finals, which is slated to occur May 20-23 in Knoxville, Tennessee.

- **7th Grade Legacy Project:** 7th grades students were challenged to develop a solution to an issue impacting a community and/or culture to which they are connected and that falls also within their own passionate interest areas potentially beginning their own legacy even at this young age. A few of the topics explored included issues such as using drones to improve access to vaccinations, creating innovative futuristic prosthetics for amputees, and developing online forums to give young voices a platform to express opinions about significant issues. Students were expected to become deeply familiar with the details of the issue so that solutions were founded on accurate, detailed understanding. For additional understanding, students conducted interviews with an expert on the chosen topic. When it came time to develop a solution, students were challenged to synthesize their own ideas with other solutions proposed by published writers and thinkers building a larger plausible paradigm for their outside-the-box solutions. This project provided students with opportunity to apply skills developed side-by-side in Language Arts and Social Studies (and for many, skills from Science and Math as well). Students were challenged to consider their own roles thus defining their legacy. Actual products ranged from published websites, awareness campaigns, and initiatives to government leaders, innovative prototypes or big ideas for prototype development.

- **8th Grade Independent Research Project:** The 8th grade science Independent Research Project (IRP) asks for a high level of creative thinking as students determine a question that is both testable and personally relevant. Students experience authentic adversity as most questions are initially rejected (not challenging enough, student already know the answer, etc.). The next layer of adversity comes as students collect data. Unlike most in-class labs, there is no procedure or scripted data table to use. Students innovate methods in the "field" (often literally the lacrosse field) and analyze, organize, and present their data.
  The IRP is a practical application of research, writing, presentation, and investigation skills. Struggling learners can fully engage in the process through the selection of a simple question. Highly Capable students (whether in the program or a mainstream class) can be challenged with the selection of a more rigorous question and the encouragement to publish their results in the online Google Science Fair. Many students report that it is their favorite assignment of the year because it is "their" work and their pride and ownership is evident in the final product.

- **HS Biology Open House**: On February 25, Larry Bencivengo's 10th grade biology students and his AP Biology students presented research projects focused on the minds of humans, particularly memory, and the behavior of single-celled organisms. "Students in my 10th grade Biology and AP Biology classes spent three weeks prior to mid-winter break working on experiments of their own design," said teacher Larry Bencivengo. "Sophomores applied their study of the nervous system to ask questions about brain function, including various aspects of memory, behavior and sensory perception."
  AP Biology students were tasked with studying aspects of the behavior of the single-celled organism *Paramecium caudatum*. Paramecia swim by means of tiny hair-like projections called cilia. The speed and direction with which the cilia beat is controlled by changes in the electrical voltage that each cell maintains across its membrane. Many students studied the effect of changing the concentration of various ions in the paramecia's environment to see how the swimming behaviors would be altered. Other experiments looked at the effect of temperature on reproduction, the ability of paramecia to respond to light of different colors, and their response to electrical and magnetic fields.

  After analyzing their results, the students had to share their results and present their projects at the Open House to parents and community members.

Theme 3: Communication and Collaboration

- **Math Talk in K-5 Mathematics Instruction:** Math Talk is a research-based structure used in every classroom to support students in developing their ability to share their strategies for problem solving, describe and justify their thinking, and engage in student-to-student discourse about mathematics. In Math Talk, teachers provide a routine in which students solve mathematics problems, individually, in partners, or in small groups, and share their solutions and solution strategies with the class. Other students listen, ask clarifying questions, and provide feedback, with scaffolding and support from the teacher as needed. Teachers can capitalize on errors and creative solution paths to address misconceptions and enhance everyone's learning. This year, we provided professional development for our 3-5 teachers to help them increase the strategic use of this structure to support better mathematical discourse.

- **Writer's Workshop.** The instructional strategies and practices in Writer's Workshop develop students' oral and written communication and collaboration skills. The architecture of the daily Writer's Workshop Mini-lesson always includes a section called "Active Engagement". In this portion of the lesson, students are often encouraged to discuss with a partner their ideas about their writing or the lesson target of the day. Often, students work collaboratively with writing partners to help one another develop a text or to analyze and revise a collaborative text. Students develop their oral and written communication skills while thinking critically about the craft and structure of writing.

- **Mondo's Bookshop Common Core:** The instructional practices and methodologies that are contained within Mondo's Bookshop Common Core have aided in students becoming better collaborators and communicators both with other students and teachers. The whole group reading sessions include read-alouds and shared reading. Read alouds are intended to allow students to practice their listening skills, as they listen to a text and answer questions. The shared reading allows students to have the text visible, but still encourages throughful discourse that involves deep analytical thinking through text-dependent questions. Students are asked to turn and talk with their peers as well as share with the whole class their thinking. The oral language component of Mondo's Bookshop Common Core assesses and fosters oral language in students. Oral language is an important aspect of learning to read, as it impacts both reading comprehension and writing composition. Throughout the entirety of the program, one can see connections to speaking and listening that the Common Core demands. Ultimately, this encourages the use of strong academic language whenever students are discussing texts.

- **IMS Schoology**: Islander is in its fourth year of utilizing Schoology as an interface between the classroom and home. Schoology is similar to Facebook in its layout, usability, and two-way communication and collaboration opportunities. It is different than Facebook in that it is a closed community. Teachers post assignments, upload documents, use it for on-line discussions and assessments. Students access homework that all downloads onto a calendar. This allows them to go to one place and see all of their work from all of their classes. We have been thrilled with the way students use Schoology for communication and collaboration. When they have a question they can post it to a classroom wall and both the students and the teacher can respond and dialogue about that question. Students can use it to work together from home. Our teachers have also found incredible ways to connect Schoology with the 1-to-1 iPad implementation. Students download work from Schoology and also dropbox assignments back to Schoology both within the classroom and from home.

- **IMS Debate**: Debate is a one-trimester elective class open to all eighth grade students. During the course, students are introduced to the fundamentals of debate and are given the opportunity to practice their debate skills in four rounds throughout the trimester. Students choose all topics and they also have the option to choose their debate partners. Students must collaborate with their debate partner, as each student fulfills a designated role within the debate. Students often collaborate with me when they need assistance formulating arguments or interpreting new information. Speaking and listening skills are cornerstones for effective debate. Each student speaks at least twice during the debate, which includes presenting their own arguments and asking the opposing team cross-examination questions about the opposing case. Students must also communicate effectively with their partner.

- **HS "Clean Water for Kids in School: Global Issues with a Local Connection":** For his Global Issues Project in Ms. Kattar's International Studies class, Senior Ian Plateau coordinated with Peter Drury, Director of Splash, an international company working to get clean water to all children around the globe. As a result of their communication, Ian and Ms. Kattar were able to bring Prakash Sharma, Director of Splash-Nepal, who is responsible for leading the initiative that is securing clean water in every public school (approximately 600) in Kathmandu, where the water is heavily contaminated, to speak with MIHS students. Mr. Sharma's visit was planned *prior to the earthquake* in Nepal; however, the program included an update on emerging details of the impact of the earthquake relative to both children and water and was incredibly timely and impactful for the five classes of MIHS students who were able to attend the event.
  Additionally, Ian, Ms. Kattar, and the Green Team co-hosted an evening event at PEAK on April 29 for community members to learn about Splash.

- **HS Career Journeys** This spring all MIHS students participated in an engaging and meaningful career exploration process over the course of Bridges lessons to help them define and connect their passions, talents, and values with real-world opportunities and professionals. The process culminated

in a 2 hour speaker/workshop event on April 30 during the school day for all students. Following the speaker sessions during lunch, 10-12 local employers had table displays to share employment tips and opportunities with interested students.
Students were provided with a comprehensive "Take Charge" career guide that provided students with valuable resources and references throughout their "Career Journey" including: career vision statement, resume building, networking tips, interview tips, and speaker contact information.

Theme 4: Information and Technology Literacy in Curriculum Design

- **K-12 Digital Citizenship:** In response to Best Practices and Federal Mandates the Mercer Island School District provides direct instruction annually for all students K-12 on Digital Citizenship. At the elementary level, topics range from safe websites and simple passwords for young students to protection of personal information, online safety and an introduction to cyberbullying for older students. In 8th through 12th grades these concepts grow in complexity and depth covering social media, etiquette, digital footprint and online presence as well as advanced search techniques and critical thinking for online research. In addition to succinct direct instruction these topics are often imbedded in classroom discussion integrated into the curriculum and student projects.

- **K- 2 iPads:** Students in our K-2 classrooms have access to a set of 7 iPads in each room. This allows for teachers to conduct a hands-on small group lesson or rotate students through independent stations by table groups or ability levels. Teachers also have the option to borrow from a neighboring class to acquire 14 iPads for a 1:2 model or borrow from all classes in that grade level for a 1:1 model when appropriate. All available apps in the separate K, 1 and 2 app catalogs have been aligned to the Common Core and are screened for content and age appropriateness.

- **5th Grade 1-1 iPads:** After a successful pilot in during the 2013-2014 school year, this year all Mercer Island 5th grade classrooms participated in a 1:1 iPad program. With a dedicated iPad for each student, teachers were able to engage their classes on a new level. Particularly powerful was the ability for students to have instant timely access to online research as opposed to previous experience with shared laptops. The most commonly installed apps are Word, Powerpoint and Garageband. With Word and Powerpoint, students have access to OneDrive which allows them to continue working on a project at home as well as save their work so they could access the changes on their school iPad.

- **6th – 12th Grade 1-1 iPad Program:** With a focus on personalized learning from the MISD 20/20 vision, the 1:1 iPad initiative was expanded so all students in grades 5-12 were in 1-1 learning environments. Placing an iPad in the hands of each student challenged students and teachers alike to adjust to a new learning experience or expand on successes from the past year. For students, the iPad not only provided them an organizational tool, but it also opened up new opportunities for higher level thinking, communication, and an array of ways to show their understanding of the skills and content they were learning. Teachers in 6th – 12th grade benefited from the accessibility of information and the formative data they gathered from the students to help them better adhere to the needs of their students. From Notability, Pic Collage, Socrative, Educreations, to creating iMovie projects with green screen features, the students and teachers used the iPads to enhance their learning.

- **IMS Flipped Classrooms:** IMS continues to explore the concept of a flipped classroom model as an instructional strategy that utilizes technology to advance student learning. In this model, student homework is to watch teacher-created videos of direct instruction about a specific topic. Students can watch the video at their own pace and multiple times depending on their individual learning needs. After watching the video at home, students do their traditional homework during class. This blended model provides students the opportunity to have more personalized learning opportunities and direct access to the teacher as they are completing their independent practice. This approach has been primarily used in mathematics courses but IMS is exploring its application in other content areas.

- **High School Radio Broadcasting:** The MIHS radio broadcasting class provides students with a unique opportunity to learn broadcasting skills, the technical components of broadcasting, and produce real-time broadcasts over KMIH and via the internet. Senior Luke Mounger produced over 150 sports broadcasts during his four years at MIHS. In addition to calling the play-by-play action, Luke learned how to use headsets, mics, and voice recorders, how to set up and trouble-shoot remote broadcast gear consisting of an iPad, broadcast codec, a mixer with multiple inputs and outputs. He had to coordinate with a variety of venues including Bellevue College, the Tacoma Dome, and a variety of local and national high schools. Additionally, in an effort to provide the best coverage possible, Luke also provided live Twitter and text updates via his cell phone. Not only has he helped with the production and programing of 150 sports broadcasts, Luke also helped secure over $4000 in sponsorships from local businesses and families to pay for the costs of these broadcasts during his time at MIHS. Luke and the station have won numerous awards from the Washington State High School Radio Awards and the real-world practicum that Luke experienced in high school has prepared him for a future in 21st century broadcasting.