Assessment for Deep Learning

A WHITE PAPER BY

Joanne McEachen

Michael Fullan
Joanne Quinn
Joanne McEachen

New Pedagogies for
Deep Learning™
A GLOBAL PARTNERSHIP

Acknowledgements

Recommended Citation:

McEachen, J. (2017). *Assessment for Deep Learning*. Ontario, Canada: Fullan, M., McEachen, J., & Quinn, J. Retrieved: http://npdl.global/wp-content/uploads/2017/09/Assessment-for-Deep-Learning.pdf

ASSESSMENT FOR DEEP LEARNING

The New Pedagogies for Deep Learning (NPDL) global partnership was formed in 2013 as a response to the widening gap between the knowledge, skills and competencies students were acquiring in traditional schooling and those to which students, their families, community members and employers ascribe real importance for life today. The partnership engages clusters of schools in seven countries (Australia, Canada, Finland, Netherlands, New Zealand, United States, Uruguay) in fostering, describing and measuring *deep learning* that closes this gap by connecting to and driving students and the world forward.

NPDL is committed to the design and identification of new pedagogies that combine to facilitate students' development of deep learning outcomes (the "6Cs" – *Character, Citizenship, Collaboration, Communication, Creativity, Critical Thinking*). Measurement of these outcomes differs greatly from the measurement practices common in education systems globally. It requires not only a deep understanding of the 6Cs themselves, but the capacity to connect that understanding with a wide range of learning evidence made available through the effective design of deep learning experiences. In addition, deep learning can only develop when the right conditions are in place to foster and sustain its growth.[1]

These three elements of deep learning – competencies, design and conditions – necessitated the creation of *New Measures* of progress and performance. Whereas traditional measures narrow learning within the confines of what students know, measures of deep learning focus instead on whether that knowledge, in conjunction with deep learning competencies, will prepare students to learn, create, act and succeed. Further, they describe the extent to which practice and conditions enable these outcomes, in the process building educators' capacity to develop them (for more on NPDL's New Measures of deep learning, as well as early findings from throughout the partnership, see the 2016 NPDL Global Report[2]).

Globally, the assessment of deep learning is emerging as a challenge requiring significant focus and capacity building. One Cluster leader identified the assessment of key competencies and capabilities as "the priority for our government," while another referred to assessment that gets at the heart of deep learning as the "holy grail" at this stage of NPDL implementation.[3] The key is in ensuring that the quality, diversity and comprehensiveness of assessment evidence is enough to fully inform the measurement of deep learning.

This paper expands on previous discussions of the measurement of deep learning through an explicit focus on the role of and process for deep learning assessment – how it's used, and what it looks like in the service of deep learning. We focus specifically on the assessment of deep learning outcomes, its pervasive role within collaborative inquiry, and how it is driven by the design and moderation of deep learning experiences.

DEFINING MEASUREMENT AND ASSESSMENT

In the context of deep learning, educational measurement and assessment take on new and dynamic meaning that accounts both for their formative and subordinate relation to the learner. They must describe and aspire to the outcomes that are actually important for learners, as opposed to those which are simply easy to measure, and their use must directly facilitate the deepening of learning not only for students, but also the teachers and school or system leaders by whom they are implemented. It's not sufficient to measure and assess learners if learning isn't deepened in the process.

The *measurement* of deep learning combines the breadth of available assessment evidence to determine current levels of deep learning, identify areas of strength and areas for improvement, and deepen, through the shared language and understanding provided by the measures themselves, the process of teaching and learning in order to further develop student outcomes.

Assessment, then, refers to the specific indicators and evidence of learning that combine to provide the complete picture of performance used to inform the measurement of deep learning, and to the process of gathering that evidence. In this way, assessment lies always underneath the process of measurement, forming the diverse and expansive evidence base without which meaningful measurement is impossible. Every assessment of student learning, for example, should be designed to directly facilitate development of one or more deep learning competency, as the evidence gathered from each assessment informs measurement with the *Deep Learning Progressions*. The same concepts can be applied to measurement with the *Deep Learning Conditions Rubrics*, or to measuring the effectiveness of assessments themselves, a process described later in the discussion of *Deep Learning Exemplar* moderation.

Deep learning requires consideration of a wealth of evidence to arrive at understandings and measure outcomes that are far more complex than one or a small number of indicators can adequately describe. The assessment of deep learning is captured in the process of Authentic Mixed-Method Assessment (AMMA), which draws from a broad range of quantitative and qualitative indicators to reveal not only what students know, but also who they are, what they can do, and how they can continue to grow.[4]

The following list, created by the NPDL Australian Cluster and shared throughout the partnership, provides a sense of the range and quantity of potential evidence sources for determining student performance:

Annotated drawings
Blog posts
Class wikis
Comics
Competition submissions
Diagnostic inventories
e-Portfolio
Essays/reports
Establishing a network/community
Exhibitions
Exit tickets
Experiments
Games/simulations
Graphic organizers (i.e. Venn diagrams)
Graphs/charts
Infographics
Interviews
Literature reviews
Mind maps

Modeling (3D)/coding
Movie making
Newspaper articles
On demand testing
Online quiz
Oral presentations
Participation in online courses/MOOCs
Participation in Socratic circles
Photography/sculpture
Plays
Podcasts
Projects/Deep challenges
Publication (ePub)
Radio/TV productions
Reflective journals
Research
Role-plays
Rubrics

Self and peer-evaluation
Stop motion animation
Storytelling (interactive e-books)
Student checklists
Student conferences
Student contracts
Student created cheat sheets
Student questioning
Teacher observations
Teacher-created tests
Volunteering
Web conference
Web quests
Website development
Word problems
Worksheets
Writing pieces (persuasive / creative / procedural etc.)

This list isn't intended as complete, but rather to demonstrate the range of assessments that, when embedded in deep learning experiences, contribute to robust and meaningful measurement.

Effective systems of assessment serve a variety of measures and yield comprehensive information designed to deepen teaching and learning.[5] At its deepest, assessment is carried out in partnership with learners at every step of the process.

COLLABORATIVE INQUIRY AND ASSESSMENT

NPDL's Collaborative Inquiry Cycle (*Assess*, *Design*, *Implement the Learning*, and *Measure*, *Reflect and Change*) describes the continuous process of inquiry shaping deep learning, as well as the approach to improving the design process for future learning experiences. Its four phases are described below in light of deep learning assessment:
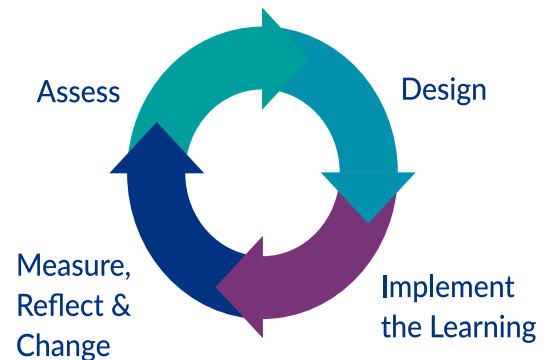

Figure 1: The Collaborative Inquiry Cycle.

- **Assess** – Real-time assessment keeps a finger on the pulse of current levels of learning and directs future learning in areas identified for improvement. Evidence that provides an understanding of where learners are and how they can progress is the foundational block on which learning is designed, implemented and measured. Gathering that evidence involves student engagement in the processes of assessment design, creating success criteria, and self-assessment that gets at the heart of who students are and what matters to them. Here and in all other phases of the inquiry process, parent and community engagement also go a long way in facilitating deep, meaningful learning for all involved. *(NPDL Tools: Pre-measurement with the Deep Learning Progressions and Teacher Self-Assessment)*

- **Design** – Identified deep learning needs are addressed in the design of learning experiences that advance students' competency development through deep engagement with key curriculum content. Students are active partners in the design of learning, co-creating experiences in which the range of assessments allows them to demonstrate their learning in unique and creative ways. *(NPDL Tools: New Pedagogies Learning Design Protocol)*

- **Implement the Learning** – Having already partnered in the initial assessment and design of their learning, students engage in meaningful assessments designed to further their knowledge and develop specific focus competencies. Teachers track and facilitate progress throughout the experience, supporting students to do the same both for themselves and one another. Flexible learning design that adapts, mid-implementation, to further identified learning areas and needs allows students to take control of their learning in powerful, perspective-altering ways. *(NPDL Tools: Monitoring of progress with the Deep Learning Progressions)*

- **Measure, Reflect and Change** – Using the wealth of assessment evidence gathered throughout the deep learning experience, students' deep learning is measured alongside the effectiveness of the experience itself. Students, teachers and other partners reflect on the learning that occurred and identify what went well and what could be improved, using their learning in the design of future assessments. *(Tools: New Pedagogies Learning Design Rubric, post-measurement with the Deep Learning Progressions and Teacher Self-Assessment, and re-design with the New Pedagogies Learning Design Protocol)*

The Collaborative Inquiry Cycle is a fluid process. Given the dynamic and evolving nature of deep learning, participants may engage in activities pertaining to one, multiple or even all phases at any one point in the learning process. Deep learning assessment is present in all phases (e.g. through initial self-assessment, co-design of learning experiences, engaging learners as active partners who play a central role in learning implementation, and the measurement of and reflection on their learning as well as identifying ways the learning experience can change to better facilitate their learning); the design and implementation of

learning are continuous and constantly respond to new learning needs and directions; and learning partners are always monitoring, reflecting on and changing learning as necessary. This concept is explored further in the following discussion of deep learning design.

DESIGNING DEEP LEARNING

Deep leaning experiences refer to learning experiences that are explicitly designed to develop deep learning competencies in learners. These outcomes, as well as learners' knowledge of traditional curriculum content, are augmented and deepened through a focus on four elements of deep learning design:

- **Learning Partnerships** – Cultivated between and among students, teachers, families and the wider environment.
- **Learning Environments** – Foster 24/7 interaction in trusting environments where students take responsibility for their learning.
- **Pedagogical Practices** – Used to design, implement, measure and assess learning.
- **Leveraging Digital** – Accelerates access to knowledge beyond the classroom and cultivates student-driven deep learning.

Engagement with learning design steeped in the new pedagogies and driven by the Collaborative Inquiry Cycle creates powerful opportunities for assessment within each element and at every phase. Incorporation of new partnerships, environments and digital technologies enhance understanding of student learning for all involved, just as student engagement in assessment, design and every other aspect of the Collaborative Inquiry Cycle represent rich opportunities to evidence learning and performance. Assessment in each of these areas adheres purposefully to the language of the Deep Learning Progressions, which describes what learning looks like at multiple levels along comprehensive dimensions of learning.

It's important to note that within the NPDL model, *pedagogy is no longer solely the concern of the teacher*. Assessment and all other elements of pedagogical practice extend now to students as well, whose roles and responsibilities are consistent not only with *learning*, but with those once blanketed under *teaching* as well. At the deepest levels of learning, students seek out and form partnerships that directly accelerate the development of ideas or solution of problems; take ownership of their learning both inside and outside classroom walls and directly contribute to the learning of others; partner in the design, implementation, assessment and measurement of their own and others' learning; and leverage and create powerful digital technologies that directly deepen every aspect of the teaching and learning process. Deep learning isn't facilitated *for* learners, but *by* learners, with others, and for the world.

The following example illustrates the potential of student-led deep learning design for creating and embedding formative assessment throughout the learning process.[6]

DEEP LEARNING EXPERIENCE AS ASSESSMENT

Driving Question: What makes a great community?

From this question, arrived at by way of students' own questions and wonderings, students set out to learn about communities throughout the world on their way to uncovering what makes communities great.

The experience formed explicit curriculum links in the areas of Language, Social Studies, Science, Mathematics and Health while also focusing on specific dimensions of each deep learning competency.

The Assessment Journey

Assess

- Students viewed photos of a rural community in Zambia and recorded their observations, thoughts and questions.
- This initial assessment revealed gaps in student knowledge and competency to be addressed through the learning that followed.

Design / Implement the Learning

- Students composed a letter to their parents with questions to discuss at home to begin to build knowledge about communities.
- Learning from discussions with parents was shared in a knowledge-building circle.
- Additional knowledge building circles were held throughout the experience to assess students' current and prior knowledge, determine next steps, assess the application of what they learned, and develop student understanding of the 6Cs.
- Throughout the inquiry, students continued to learn with their families and to bring artifacts from home that furthered their work at school (e.g. newspaper articles).
- Students co-created a visual tool titled "Collaboration Mountain," which was used for ongoing self- and peer-assessment of progress in developing the Collaboration competency.
- Regular check-ins and reflections on collaboration occurred throughout the learning.
- Students leveraged technology to learn about global communities in partnership with older students at the school.

- During a "community walk," students took pictures of key community features to be used for information and reference.
- Student voice and interests not only demonstrated their knowledge and competency development, but drove the learning in new and unexpected directions not originally included in the learning design.
- Students determined that they wanted to create their own "dream communities" in collaborative groups, and the communities were self-assessed, peer-assessed and teacher-assessed using co-created success criteria.
- Progress was communicated through regular conferencing with groups and individual students.
- Students exchanged emails with a school in South Korea to learn and share about their respective communities.
- Students shared their learning with various tools such as the "Explain Everything" app.
- Google Earth was used to support mapping skills, explore satellite images of global communities, and to gather information on population density and landscape.
- Students created their own three-dimensional community maps, on which performance was assessed using co-created success criteria.
- Photos and videos were used to capture student learning and support assessment of student progress.
- Learning was continuously documented on a co-created bulletin board.
- Students decided to host a "Community Day" on which they shared and further developed their learning in partnership with family and other community members.

Measure, Reflect and Change

- Growth of Citizenship, Collaboration and Creativity were measured using the Deep Learning Progressions.
- Students' development of key content knowledge was mapped against the curriculum, assessed and measured.
- Ongoing self-assessment supported students to reflect on their learning and make changes both following and during the learning experience.
- Student reflections at the end of the experience were recorded on video.
- Reflections from families and community members on "Community Day" added to the evidence of learning gathered throughout the process.

Key Takeaways

- The design and implementation phases were integrated seamlessly as the flexibility of the learning design allowed for adaptation and changes in direction mid-implementation.

- One driving question and the co-creation of an overarching assessment framework opened the door for a multitude of assessment opportunities in which students took on an active and central role.
- The assessments detailed above in each phase of the Collaborative Inquiry Cycle often reflect the interconnectedness of multiple elements of deep learning design (Learning Partnerships, Learning Environments, Pedagogical Practices, Leveraging Digital).
- New pedagogies, emerging through the language of the Deep Learning Progressions and other NPDL tools, supported assessment at all phases of the Collaborative Inquiry Cycle and in all elements of deep learning design.

DESIGNING AND MODERATING DEEP LEARNING EXEMPLARS

After or throughout a deep learning experience, teachers have the opportunity to design and share Deep Learning Exemplars – examples of learning experiences that describe deep learning, the new pedagogies that bring it to life, and the assessments that evidence its development. Teachers design Exemplars as a collection of documents, written or visual descriptions and reflections, videos, pictures, or any other means of representing and describing the deep learning that occurred. Collectively, Exemplars describe what deep learning looks like at every level of NPDL's Deep Learning Progressions, and facilitate collective identification of the new pedagogies that accelerate deep learning outcomes for students.

Deep learning experiences (such as the example in the previous section) are themselves assessments, the depth of which allow for layered or *nested* assessment throughout the learning journey. All evidence collected at each layer and in every phase inform the measurement of deep learning. Presented in the form of an Exemplar, both that evidence and the ensuing measurement inform measurement of the effectiveness of the deep learning experience itself with the *New Pedagogies Learning Design Rubric*. For each element of deep learning design, the Rubric describes what an experience looks like at multiple levels of a progression. Measurement and reflection with this tool support re-design for future iterations of the same experience, as well as deeper design of new experiences that follow.

This Rubric is also used by teachers' peers and other school and education leaders during the process of *Deep Learning Exemplar moderation*. The moderation process is intended to:

- Engage teachers, school leaders and NPDL leadership teams at all levels of the partnership in professional dialogue to develop a shared language and

understanding around deep learning and the new pedagogies that most effectively develop the 6Cs for all learners.

- Provide teachers and all NPDL participants with examples of deep learning design, implementation, assessment, measurement and outcomes that can be leveraged to design deep learning experiences in their own local contexts.
- Establish inter-rater reliability among NPDL participants in their use of the New Measures for deep learning.

Moderation occurs at school, Cluster and global levels. Global moderation occurs twice yearly and engages teachers, school leaders, Cluster leaders and the NPDL global team in a multi-week, collaborative examination and measurement of the deep learning taking place in each NPDL Cluster, as evidenced by teachers' shared Exemplars. The process builds understanding of the current level of deep learning globally, identifies areas of strength and for improvement globally and in individual contexts, and results in the global sharing of highly rated Exemplars.

Several Clusters have either established or are in the process of establishing Cluster-level moderation processes. Those that have already occurred have engaged Cluster members in the moderation of their schools' Exemplars, resulting in the selection of Exemplars for moderation at the global level.

At the level of individual schools, the value and importance of moderation has proven invaluable. The process supports teachers and other NPDL participants to understand how the NPDL tools and processes fit and work together; build their capacity to measure deep learning and the effectiveness of varying pedagogies in bringing it to life, in a valid and reliable way across moderators; and share and learn with and from colleagues in regard to deep learning design and best practice. Capacity building in this vein has also been shown to add value in the direct connection of teacher professional learning with the examination of student learning.[7] In the context of assessment, the moderation process provides teachers with a range of deep learning assessments and assessment practices that have already been applied in the context of their own school. Teachers learn which assessments have been used to effectively develop and provide evidence of deep learning, and they build the collective capacity to use formative assessment in ways that lead to the measurement and simultaneous advancement of deep learning. Exemplars that best describe and evidence deep learning in individual schools are selected for moderation at the Cluster level.

In some cases, Clusters have created Exemplar submission templates for use in their schools. These have then been shared at a global level to support schools in Clusters throughout the partnership. NPDL has created a Global Exemplar Template that consolidates those created at the Cluster level.[8] The template is not mandatory, nor does it

need to be followed strictly, but is rather intended to support participants in the design of Exemplars by demonstrating the types of evidence moderators will be looking for, in light of the New Pedagogies Learning Design Rubric. Some participants have described the process of designing Exemplars as too "formal" and "structured," lending insight to the understanding that Exemplars should reflect the context of each learning experience in the form or format that best demonstrates the learning that occurred.[9]

One of the main findings from Exemplar moderation thus far concerns the importance of clearly and comprehensively presenting the necessary evidence of deep learning. Just as a range of assessment evidence is required to determine student progress and performance on the Deep Learning Progressions, the same range is required for demonstrating that evidence of progress within the Exemplar. In addition, teachers face the challenge of providing evidence for moderators who, in some cases, have no context or information other than that included in the Exemplar with which to inform their measurement with the New Pedagogies Learning Design Rubric. In this as in all measurement, the diversity and completeness of the underlying assessment evidence is critical.

Given these challenges, and no matter the format of the Exemplar, those that provide the most comprehensive and illuminating evidence typically include, though are not limited to, the following:

- **Context** – Providing information including student age ranges, a brief description of the learning experience, curriculum areas and focus competencies add important context to the accompanying evidence of learning. It's also useful to describe why and how the deep learning experience came to be – does it build off previous learning? What is the driving question, and why is it important to learners? What were the specific learning gaps or needs that this experience set out to address?
- **Collaborative Inquiry Evidence** – Describe and fully evidence the learning process at each phase of the Collaborative Inquiry Cycle. How did you conduct and what did you learn from the initial and ensuing assessment of student learning, what assessments were embedded in the experience to ensure valid measurement of whether deep learning was occurring and did occur, and how were they formative in deepening student learning; how did the learning design directly respond to assessed needs or opportunities; what was the process of implementation; and based off measurement and reflection, how and in what ways can the experience and pedagogical practice change to further deepen learning outcomes?
- **Learning Design Evidence** – Provide explicit evidence of learning partnerships, learning environments, pedagogical practices and leveraging of digital technologies, focusing on and evidencing how they directly deepened the learning. Evidence relating to the four elements of deep learning design is highly intertwined with the Collaborative Inquiry Cycle. It's useful to provide self-ratings on each dimension

with the New Pedagogies Learning Design Rubric, referring directly to and using the language of the Rubric to describe provided evidence. The aim is to ensure that enough evidence is available so that anyone working with the Exemplar would come to the same ratings.

- **Progression Ratings** – Pre- and post-experience Progression ratings, along with accompanying evidence and explanations, indicate whether the experience was successful in developing students' deep learning outcomes. If ratings are provided for only a select number of students, explain why those students were selected. Again, use the language of the Progressions and ensure provided evidence is enough for moderators to arrive at the same ratings. Just as the assessment evidence indicates whether students are developing the 6Cs, measured levels of competency development indicate the effectiveness of employed pedagogies, and of the overall learning experience.

- **Curriculum Links and Academic Impact** – Exemplars also establish the curriculum links that help frame the learning experience, along with evidence of how the experience deepened academic outcomes *in conjunction with* the 6Cs. How did the learning experience facilitate learners' development of the 6Cs *through* their engagement with the curriculum? Similarly, how was student performance in the curriculum strengthened as a direct result of the new pedagogies and the competencies they develop?

- **Student and Learning Partner Voice** – Students are at the center of the learning experience, meaning they, and the evidence of their learning, should be equally central to the Exemplar. Their voices and those of other learning partners shape the assessment of learning in ways that second-hand descriptions of learning often cannot. Taking this further, there is room to involve students and other learning partners in the design and creation of Exemplars, in that process deepening understanding of student learning through their own understanding of what evidence demonstrates their deep learning.

The common theme here, as in all assessment, is *evidence*. Exemplars are powerful descriptions of and tools for understanding deep learning as long as they form explicit links between evidence of deep learning and the pedagogies that bring it to life for learners. No matter the format, the driving question for the design of Exemplars is: *what evidence will show that and how deep learning occurred, so that NPDL participants globally can use the New Measures in conjunction with the Exemplar to arrive at the same conclusions about student learning, and to deepen their own learning in the process?*

NPDL hosts a bank of Exemplars on its Deep Learning Hub, accessible to all NPDL participants. Similar assessment banks are useful in providing examples of assessments that can be implemented in individual schools or classrooms[10], whereas the Exemplars designed and shared throughout NPDL provide not only assessment designs, but

descriptions, reflections on and evidence of the learning as well. There are 50 Exemplars currently shared globally, and this number grows with each global moderation cycle. Additional Exemplars are also available within individual Clusters and schools, and they support capacity building and the deepening of learning for all participants. In addition to Exemplars moderated in local moderation processes, global Exemplars can be used to develop moderation capacity, identify new assessments and pedagogies for application in individual contexts, and improve deep learning design to in turn improve deep learning outcomes.

Deep engagement with the overarching and embedded assessments detailed in NPDL's Exemplars, in conjunction with the New Pedagogies Learning Design Protocol and Deep Learning Progressions, is a powerful approach to supporting the design and facilitation of authentic deep learning assessment in schools across the globe.

CONCLUSION

The measurement of deep learning must be always informed by a wealth of underlying assessment evidence that captures the complete picture of who students are, what they know, and whether they are prepared to use that knowledge to advance their lives and others'. Embedding formative, student-driven assessment at every phase of the learning process ensures that every opportunity to assess student learning is also used to develop it.

The interconnectivity between the Collaborative Inquiry Cycle and the four elements of deep learning design provides fertile ground for deep learning experiences in which students are true and active partners in every aspect of the learning process. Exploring and co-designing new learning partnerships, learning environments, pedagogical practices and opportunities for leveraging digital within the process of collaborative inquiry propels learning to new levels of meaning and self-direction.

Deep Learning Exemplar moderation has emerged as a highly influential process for identifying the assessments and, more widely, pedagogies that deepen student learning. Expanding the moderation process to additional Clusters and schools throughout NPDL will extend the partnership's collective capacity to not only design learning that facilitates development of the 6Cs, but also to identify, design and incorporate a range of assessment evidence in all measurement of deep learning. In the same way that deep learning involves students as partners in all aspects of learning, there is further opportunity to involve them in the fully evidenced description of their own learning that is necessary in the design of Exemplars.

The most significant challenge in creating and sharing Exemplars matches that of the measurement of deep learning: *sufficiently evidencing whether deep learning has occurred.* Additional tools and further exploration of this space globally will advance participants' capacity to design and embed layered assessment systems that fully inform the measurement of deep learning outcomes.

ENDNOTES

[1] For further information on NPDL's system, methodology and tools, see: Fullan, M., Quinn, J., McEachen, J., & (2017) New Pedagogies for Deep Learning. Corwin. Publication forthcoming 2017.

[2] New Pedagogies for Deep Learning (2016). NPDL Global Report. (1st ed.). Ontario, Canada: Fullan, M., McEachen, J., Quinn, J. Retrieved from http://npdl.global/wp-content/uploads/2016/12/npdl-global-report-2016.pdf

[3] Interviews conducted with NPDL Cluster leaders by the NPDL global team.

[4] Davidson, E., and McEachen, J.. Making the Important Measurable, Not the Measurable Important: How Authentic Mixed Method Assessment Helps Unlock Student Potential – and Tracks What Really Matters. Seattle, WA: Learner First, 2015. Print.

[5] Conley, D.T., & Darling-Hammond, L. (2013). Creating systems of assessment for deeper learning. Stanford, CA: Stanford Center for Opportunity Policy in Education. Pg. 13.

[6] Information and evidence taken from a Deep Learning Exemplar created by Jodie Howcroft of Millgrove Public School in the Canadian Cluster. Exemplar available to NPDL members on the Deep Learning Hub.

[7] Darling-Hammond, L. (2017). Developing and Measuring Higher Order Skills: Models for State Performance Assessment Systems. Council of Chief State School Officers (CCSSO). Pg. 49.

[8] Global Exemplar Template available to NPDL members in the "Deep Learning Design" section of the Deep Learning Hub.

[9] Research from an external evaluation of NPDL conducted by the American Institutes for Research (AIR). Report forthcoming.

[10] See the Performance Assessment Resource Bank:
https://www.performanceassessmentresourcebank.org/