Policy Notes

Practicable Integration of the Science of Learning in Teaching

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INTRODUCTION

The Department of Education (DepEd) undertook an in-depth and rigorous review of the K–12 Basic Education Program to address alarming issues that manifested during its implementation, including the congested curriculum, misaligned learning competencies, and imbalanced cognitive demands (DO 10, s. 2024). The move also reflected the department's commitment to ensuring that the nation's basic education is on par with global education standards.

This review of the K to 12 Program led to the revised K-10 curriculum, which features competencies that are streamlined with the developmental stages of learning following logical progression. This can impact on the achievement of learning success.

To support this feature, understanding where the learners currently are in their educational journey is critical. This principle is built into the Science of Learning (SoL) which aims to bridge the gap between what we know about how humans learn and the impact it can have on teaching and learning practices (Deans for Impact, 2015; The Education Hub, n.d.).

KEY IDEAS

1. **Supporting evidenced-based practice**
   To make learning experiences more meaningful, teachers can integrate key cognitive science concepts into their teaching. These include understanding brain development, recognizing the limitations of working memory, reducing cognitive load, and encouraging metacognition. Consequently, teachers can personalize their teaching, develop lessons that offer deep learning, and empower students to participate in their learning actively.

   a. **Developmental brain growth**
      Insights on how the brain develops over time can help teachers tailor instruction to students' cognitive abilities and needs.

   b. **Working and long-term memory**
      Understanding the limitations of working memory and the significance of transferring information to long-term memory can help teachers create effective learning experiences.

   c. **Cognitive load**
      Reducing cognitive overload by presenting information in manageable chunks and supporting opportunities for practice can enhance learning and reduce frustration.

   d. **Metacognition**
      Guiding students to think about their own thinking can empower them to become active learners and monitor their understanding.

2. **Promoting student learning by applying Science of Learning in teaching practices**
   Teachers can incorporate strategies that align with the principles of SoL to improve student learning. Thinking activities are essential for promoting deep understanding and long-term retention. Teachers can also promote metacognition and active learning by presenting opportunities for learners to think about the concepts being taught and to reflect on their learning processes.

Deliberate practice is another proven efficient strategy. It engages students in focused practice with teacher feedback to facilitate skills development and retention of content understanding. In time, teachers can significantly assist their students to master new concepts and skills by giving necessary avenues for them to practice and receive feedback.

Moreover, active recall and linking new ideas with old ones are crucial to support learning. Active recall entails retrieving information from memory without relying on external cues while linking new ideas to prior knowledge. This can help students create meaningful connections and deepen their understanding.

Lastly, there is an approach called spaced learning. It requires reducing extensive/long lessons into more lessons of shorter duration with breaks between them. This way, teachers can help students retain information more successfully and make their learning experience significant.

3. **Comprehensive Integration of Science of Learning**
Integrating SoL into all aspects of the curriculum is key to its successful implementation. This involves applying the principles of cognitive science throughout the entire teaching process, from developing learning resources to carrying out assessments. Also, teacher training on the use of SoL is needed to properly and consciously apply the principles of cognitive science.

a. **Curriculum Design**
Learning materials should be developed with cognitive science principles in mind. This includes considering factors such as cognitive load, active learning, spaced practice.

b. **Assessment Practices**
Lower-order thinking skills should be acknowledged as the basis for higher-order abilities in designing formative and summative assessments. Teachers may use authentic tasks to assess student learning, offer opportunities for students to explain their reasoning, and incorporate formative assessment to provide timely feedback.

c. **Teacher Professional Development**
Teachers should receive ongoing professional development (PD) in the science of learning. This will equip them with the knowledge and skills to implement effective teaching practices that align with cognitive science principles.

What is the Science of Learning and its implication to teaching and learning?

SoL focuses on the cognitive processes involved in how students learn. This means that teachers at all levels need a solid grasp of the most effective ways students learn best, and what teaching practices promote or hinder learning. As both a process and an outcome, learning is closely tied to brain function and cognitive factors. Understanding these concepts should become a core element of teacher knowledge and practice (Jha, 2024).

*Classroom observation at the **Santiago Syjuco Memorial School** in Malabon City.*

One of the key principles in the SoL is understanding that how learners engage with information in their working memory affects how it is stored in their long-term memory. In this sense, curriculum designers and implementers, including teachers, are expected to (i) be conscious of the working-memory demands of a material being presented to avoid cognitive overload and impede learning and (ii) monitor learners against some form of learning progression, and use this information to adjust the direction and level of teaching according to what learners already know.

Recognizing brain-based learning, which is a key aspect of the SoL, can be valuable for teachers. It can guide them structure student learning and develop study habits, allowing for greater memory retention. Brain-based learning is based on the idea that learning happens when nerve impulses move effectively among neurons, thus establishing strong neural networks in the brain. This results in improved memory recall and utilization, can be used by teachers to increase student learning.

Brain-based learning, a key aspect of the SoL, is an approach based on an understanding of how the brain works. Knowing how the brain processes information and establishes links, teachers can design lessons or learning materials that help students learn better and remember more. This approach can enhance memory and recall, making learning more enjoyable and effective.

RECOMMENDATIONS FOR POLICY AND PRACTICE

In the current educational context in the country, what are the most sensible ways in which SoL can support learning recovery?

1. Ensure that the integration of the SoL across the National Learning Recovery Plan (NLRP) is supported by other complementary efforts. The incorporation of SoL can lead to a more successful and impactful NLRP when supported by other complementary efforts.

   The National Learning Camp (NLC), a subprogram under the NLRP, is guided by the SoL. Nevertheless, as highlighted by EDCOM 2, the NLC's full potential can only be realized when all aspects of the program, including the mandatory implementation of remediation, are realistically executed. This emphasizes the key role of each stakeholder in warranting the NLRP's success.

2. Ensure that the implementation of both the NLRP and the revised curriculum is impeccably supporting one another, given that the success of integrating the SoL also depends on the effective implementation of all other efforts.

   DepEd is yet to release respective issuances for other programs under the NLRP, which includes the National Reading Program (NRP), National Mathematics Program (NMP), National Science and Technology Program (NSciTP), and other programs implemented across DepEd that support learning recovery efforts.

   Meanwhile, sentiments on social media describe that the current implementation of the curriculum yielded a higher-than-usual cognitive load among teachers.

3. Include the SoL in the professional development (PD) of teachers.

   The groundwork of the SoL come from a blend of advanced research and practical application. This goes beyond traditional approaches to embrace strategies based on how the human mind processes and remembers information.

   The SoL should be integrated into relevant courses in both pre-service teacher education and PD initiatives for in-service teachers, including collaborative expertise sessions. The National Educators Academy of the Philippines (NEAP) can play a key role in facilitating these initiatives align with recent research and best practices. NEAP can create and deliver PD programs focused on the SoL, equipping teachers with the compulsory knowledge and skills to implement effective teaching practices. Additionally, NEAP can collaborate with TEIs to integrate the SoL into pre-service teacher education programs.

RITQ is assisting DepEd in integrating the Science of Learning across teaching and learning practices. This framework is being used to guide the development of revised curriculum materials and to equip teachers with the skills needed for effective curriculum implementation and delivery.

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The Research Institute for Teacher Quality (RITQ) at the Philippine Normal University (PNU) in Manila was founded as a research center 12 years ago. This year, it renewed its mandate as a research institute committed to enhancing the quality of education in the Philippines. RITQ is a partnership between PNU and the University of New England Australia through its SiMERR National Research Centre. It focuses on high-impact, applied research initiatives that aim to improve teacher quality and address the factors that influence it.

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A leading research organization providing evidence-based policy advice for strengthening the quality of teachers, school leaders, teacher educators, and of teaching

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To conduct high impact, applied research directed at strengthening the quality of teachers, school leaders, teacher educators, and of teaching

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1. **Teacher Quality**
   Providing research-based policy advice to relevant institutions and agencies, such as but not limited to, teacher education institutions (TEIs), Professional Regulation Commission (PRC), Commission on Higher Education (CHED), Department of Education (DepEd), and the Teacher Education Council (TEC) on the education and training of pre-service teachers to meet the expectations of the teaching profession, and in-service teachers to strengthen their professional practice in alignment with professional standards.

2. **School Leader Quality**
   Providing research-based policy advice to TEIs, DepEd, and the TEC on the education and training of school leaders from different levels of school governance in alignment with professional standards.

3. **Teacher Educator Quality**
   Providing research-based policy advice to TEIs, CHED, and the TEC on the enhancement of content knowledge and academic practices of teacher educators, who contribute to the education of pre-service and in-service teachers.

4. **Teaching Quality**
   Providing evidence-based recommendations on effective teaching in basic education and teacher education in the country.