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EXECUTIVE SUMMARY

Student-Centered Learning: Functional Requirements for Integrated Systems to Optimize Learning

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The mission of the International Association for K–12 Online Learning (iNACOL) is to catalyze the transformation of K-12 education policy and practice to advance powerful, personalized, learner-centered experiences through competency-based, blended and online learning. iNACOL is a non-profit organization focusing on research, developing policy for student-centered education to ensure equity and access, developing quality standards for emerging learning models using competency-based, blended and online education, and supporting the ongoing professional development of classroom, school, and district leaders for new learning models. Learn more at www.inacol.org.



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iNACOL, The International Association for K–12 Online Learning
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Executive Summary

"A growing body of research suggests that overall student achievement is likely to increase when students are able to learn at their own pace with a variety of teaching styles and formats available to them. Personalizing students' education enables them to access a unique learning experience based upon their individual needs, rather than receiving instruction through a standard, paced curriculum. In its ideal form, the needs of students are put first."¹ The result is a growing demand for student-centered, transformative digital learning using competency education as an underpinning. Student-centered learning encompasses personalized learning, competency-based education, anytime, anywhere practices and student ownership. How districts and schools implement student-centered learning varies greatly according to the organization's philosophy and the needs of the students.

Technology can play a powerful role in the implementation of student-centered learning if used for empowering students and learning teams.

Organization of the Paper

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- Section I:* Student-Centered Learning
- Section II:* Implications of the Four Tenets of Student-Centered Learning for Technology
- Section III:* Design of a Student-Centered Learning Integrated System: Requirements and Use Cases
- Section IV:* Shifting from Traditional Course-Based Information Systems to Student-Centered Learning Integrated Systems
- Section V:* A Student-Centric Approach to Student-Centered Learning Integrated System Design
- Section VI:* Using This Information
- Section VII:* Conclusion
- Appendix A:* Understanding Education Technology Standards
- Appendix B:* Data and Application Design for a Student-Centered Learning Integrated Information System
- Appendix C:* Glossary

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This paper is a structured effort to examine the needs of end users and to explore how technology can address those needs within the context of student-centered learning. It proposes a specific set of enterprise-level business capabilities and discusses the functionalities that information systems need based on a student-centric instructional cycle. It also outlines the system requirements and functional capabilities for an integrated system to manage student-centered learning. The approach taken in providing this framework is comprehensive. It is unlikely that a district or school would implement all the functionality and correlated systems as they begin their journey towards student-centered learning. In determining what systems to use and integrate, an organization must consider what it wants to accomplish through the use of these systems and how this aligns with the organizational vision, educational goals and strategic plan. The paper includes some suggestions on how to approach this.

1. "Best Practices in Personalized Learning Environments (Grades 4 – 9)." Hanover Research. October 2012. <http://www.hanoverresearch.com/media/Best-Practices-in-Personalized-Learning-Environments.pdf>

SECTION I: STUDENT-CENTERED LEARNING

This section introduces the need for and promise of student-centered learning in optimizing learning. Student-centered learning models personalize learning with the use of competency-based approaches, supported by blended and online learning modalities and environments, as well as extended learning options and resources. There is a focus on student ownership of learning. Students share responsibility for their own learning with their teachers, parents/guardians and other support persons. Teachers use technology to analyze and utilize real-time data to differentiate instruction, customize learning and engage students in deeper learning. Students use technology to consider their real-time progress data in focusing their learning, to access resources, to collaborate and communicate with others and to demonstrate evidence of their learning. Education that is student-centered has tremendous potential and recent results are promising. Both the Nellie Mae Education Foundation and iNACOL consider the transformation of today's education systems to student-centered learning to be of critical importance.

SECTION II: IMPLICATIONS OF THE FOUR TENETS OF STUDENT-CENTERED LEARNING FOR TECHNOLOGY

This section examines the tenets of student-centered learning in terms of the ways technology can empower students, educators, parents, advisors, mentors, and school and district leaders, and it proposes functional requirements for these user groups. This learner-centric ecosystem must support the complicated set of processes that make up personalized, student-owned, collaborative, anytime, anywhere learning and competency-based education. Because no single platform will be able to meet these needs, the paper proposes the need for a modular, integrated system design that incorporates interoperability principles.

SECTION III: DESIGN OF A STUDENT-CENTERED LEARNING INTEGRATED SYSTEM: REQUIREMENTS AND USE CASES

In order to inform practice—and anchoring this integrated system design—one must consider: the individual learner's learning experiences, resources and interactions with peers, educators and others involved in the education; how these experiences and interactions are supported and assessed; and the ways in which these data and reports are used.

An additional focus of the system design for student-centered learning involves facilitating student ownership of learning by engaging students in co-planning their education, incorporating their interests and skills into the learning process, monitoring their progression and celebrating their own successes. Students use data to diagnose, direct and drive their learning. They have multiple opportunities to direct, reflect and improve on their own learning through formative assessments and data reports that help them understand their own strengths and learning challenges. Students take increasing responsibility for their own learning, using strategies for self-regulation and reflection.

The paper proposes a student-centered instructional cycle that differs from a traditional instructional cycle. The central elements described in that cycle form a logical relationship for student learning, as represented in Figure 1 below.

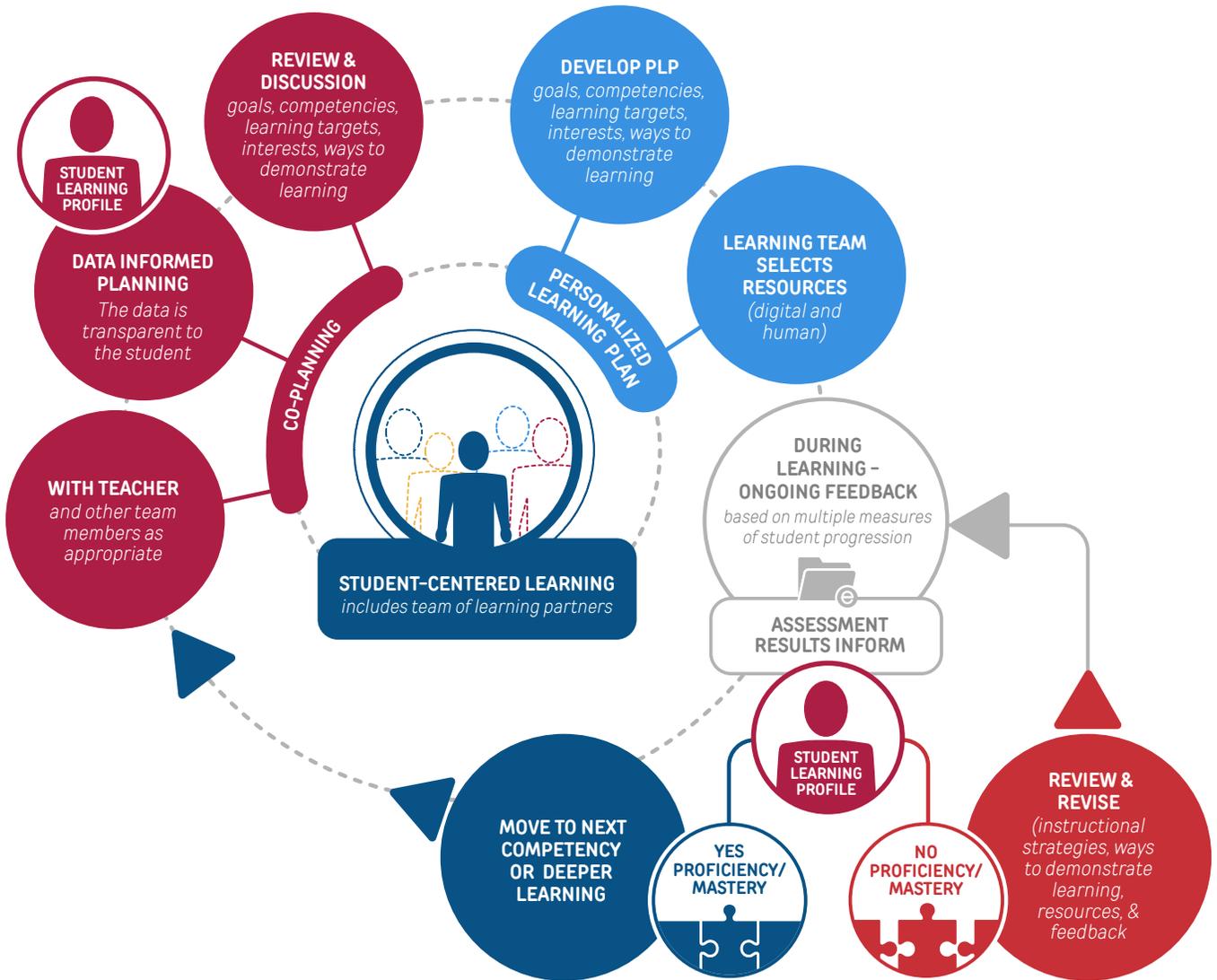


Figure 1. Instruction Cycle for Student-Centered Learning

SECTION IV: SHIFTING FROM TRADITIONAL COURSE-BASED INFORMATION SYSTEMS TO STUDENT-CENTERED LEARNING INTEGRATED SYSTEMS

This instructional cycle for student-centered learning serves as the foundation for understanding the enterprise-level business capabilities and the integrated information systems’ functionality needed to support that cycle. There are significant impacts on the information systems and the business capabilities a district or school deploys in supporting student-centered learning. A structured approach to this transformation that uses the

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methods and practices of process improvement and redesign has proven to be a helpful practice in analyzing and defining the business capabilities needed. A description of this process and work is beyond the scope of this paper. However, this paper's idealized conceptual architecture is based on work in this field.

Below, find an idealized conceptual architecture designed for student-centered learning that would include the processes and systems needed to support the district's core business capabilities:

- » Student Profile
- » Learning Management
- » Online Learning Environment
- » Assessment Management
- » Learning Materials Management
- » Curriculum Management
- » Social Learning and Collaboration
- » Evidence of Learning
- » Intervention and Support
- » Performance Management
- » Reporting and Analytics
- » Learning Resources Management

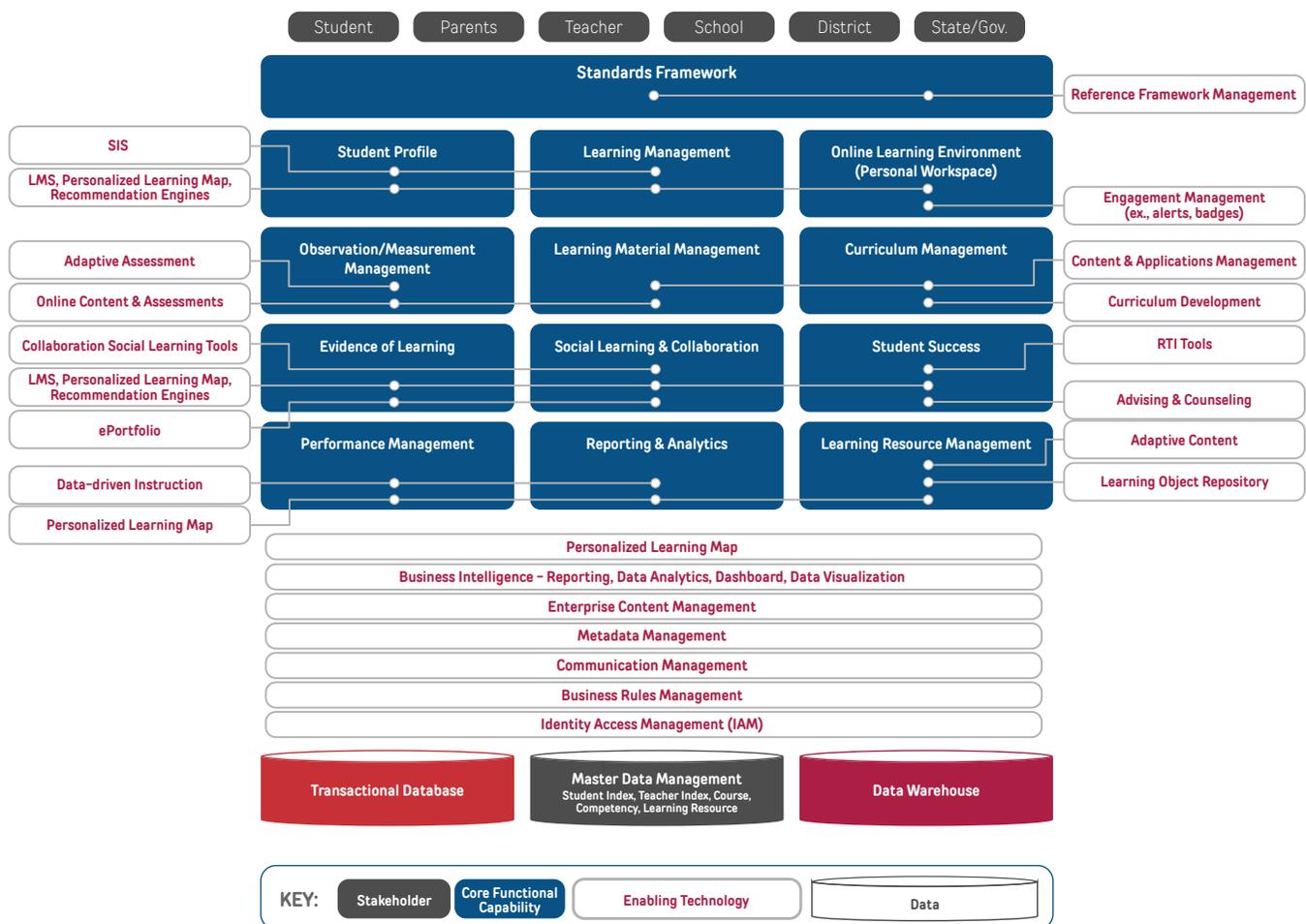


Figure 2. Conceptual Framework: District Core Capabilities for Student-Centered Learning with Enabling Technologies

SECTION V: A STUDENT-CENTRIC APPROACH TO A STUDENT-CENTERED LEARNING INTEGRATED SYSTEM

The section discusses the core functions essential to a robust, student-centered learning integrated system:

- » A reference framework for aligning learning experiences, resources, assessment and reporting to the competencies
- » Customized learner profiles that combine data from source systems and input from students, parents, educators and others who work with the student
- » Personalized learning plans that are responsive to the learner as he or she progresses and changes
- » A variety of learning experiences within and beyond the school setting and calendar plus the collection of the associated data to inform student progress
- » Access to content, digital resources, human resources and tools through a user-centric interface
- » Meaningful, timely feedback during the learning process
- » Multiple ways of demonstrating and assessing mastery toward competency
- » Relationships, collaboration and communication
- » Dashboards that reveal in real time which concepts and objectives students struggle with, pinpoint at-risk students and enable targeted intervention
- » Analytic tools to support data-informed practices (learning, teaching, administration)
- » Integration of multiple systems and data flows using data and interoperability standards and practices

To support these core functions of student-centered learning, multiple systems must work together to enable the desired learning ecosystem. Therefore, the technical design of the system is modular and based on the integration of multiple technologies. The integrated student-centered learning information system design organizes the process functionality into key components.

- » Online Learning Environment Functions
- » Integrated Content, Activities, and Feedback Functions that the learner will access through the Online Learning Environment
- » Observation and Measurement Functions
- » Evidence of Learning Functions, and
- » Social and Collaborative Learning Functions

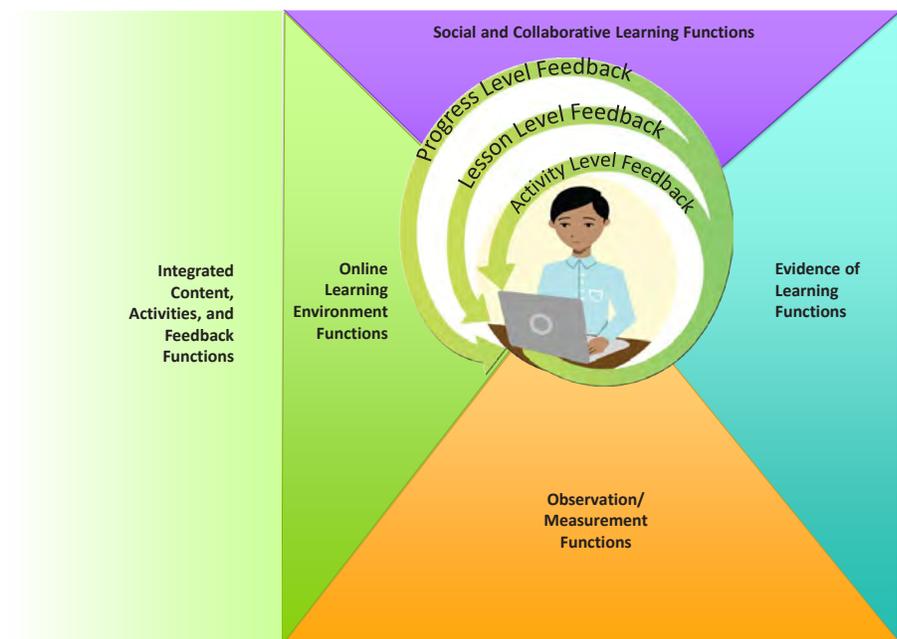


Figure 3. Key Functional Components

Each of these core functional areas represents high-level functions and includes a variety of capabilities and components, presented within a broad context. Appendix B: Data and Application Design for a Student-Centered Learning Integrated System provides the detailed explanations.

SECTION VI: USING THIS INFORMATION

This section explores in detail the implications for which functional capabilities need to be enabled and/or supported by integrated instructional and information systems using different instructional approaches to student-centered learning models. Although it is unlikely that a school would implement all of these functions, a school district or governing body for a network of schools might have a variety of implementation models within their ecosystem. Districts and schools will need to determine what functions they want an integrated student-centered learning information system to serve. The section includes some use case examples and suggestions for RFPs.

SECTION VII: CONCLUSION

What a reader might find most useful in this paper will vary by role.

Implementing student-centered learning is a complex transformation process that takes extensive planning and commitment, professional development and support for all involved. Chunking implementation and growing organically according to need or program model will be essential. Using an integrated student-centered learning system can make it more manageable and effective if the systems' instructional and business purposes are clearly understood and if training and support are provided using a growth mindset and continuous improvement process.

WHAT CAN YOU TAKE AWAY FROM THIS PAPER?

If you are an educator, how will you work with your students and colleagues to optimize student learning, and how can technology promote innovation in a student-centered learning environment?

If you are a leader in the school system, this paper will help you understand how your school system can provide the complex technologies needed to support student-centered learning and enable users to successfully utilize these technologies. It will also explore how you can take advantage of the data and analytics such systems provide to improve practices.

If you are a technology development leader, you might ask: How can your work fuel student-centered learning? Are you using a student-centered learning integrated system approach with an emphasis on a student-centric view? What can you do to learn from students, educators and community members to engineer systems that meet the needs of the end users? How are you using design principles and data and interoperability standards so that your systems facilitate the openness, extensibility and coherent integration of functionality needed to support the many nuances of student-centered learning? How are you structuring functional requirements in proposal requests with use cases to better identify appropriate IT solutions?

We want to give a special thank you to the Nellie Mae Education Foundation. We are grateful for their support of this report and their collaborative commitment for identifying infrastructure needs for student-centered learning systems. There are times when philanthropic leadership is invaluable in helping our country take innovative leaps. With the greatest appreciation, we want to thank the Nellie Mae Education Foundation for their investments to support student-centered learning. The Nellie Mae Education Foundation's pioneering spirit and drive for creative problem-solving and new designs exemplify the qualities that we want our children to have to be able to adapt to the global challenges before us.



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