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Title Slide: Introduction to the International Activities Program Studies

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This module provides information on the three main International Activities Program, or IAP, studies: the Progress in International Reading Literacy Study, or PIRLS; the Trends in International Mathematics and Science Study, or TIMSS; and the Program for International Student Assessment, or PISA.

This module will provide general background information for each study; and then describe the components of each study, the study frameworks, and the additional resources available for each study. The subsequent IAP studies training modules contained within the DLDT system discuss these studies in greater detail and address questions about how to effectively use the datasets for your analytic purposes.

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This module provides information on the three main International Activities Program studies PIRLS, TIMSS, and PISA.

PIRLS is administered every 5 years, to students in 4th grade. It includes a student reading literacy assessment and contextual questionnaires for students, their teachers, and their school principals. A curriculum questionnaire is also administered to the PIRLS National Research Coordinator (NRC) in each participating education system. A contextual questionnaire for the students' parents or guardians, called a home questionnaire, is also administered, though not in the United States.

TIMSS is administered every 4 years, to 4th- and 8th-grade students. It includes a student assessment in mathematics and science and also contextual questionnaires for students, their teachers, and their school principals. A curriculum questionnaire is also administered to the TIMSS NRC in each participating education system.

PISA is administered every 3 years, to 15-year-old students. It includes a student assessment in mathematics, science, and reading literacy, as core subjects each administration. In 2003, a problem solving assessment was also administered. In 2012 and 2015 an optional financial literacy assessment was administered. And, in 2012 computer-based assessments in mathematics and reading literacy and problem solving were administered. In 2015, assessments in collaborative problem-solving were also administered. In addition, contextual questionnaires are administered for students and their school principals. PISA also includes a contextual questionnaire for the students' parents or guardians, though the United States has not administered this questionnaire.

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These studies are international comparative studies that allow for comparisons of students across national and other subnational education systems, such as participating Canadian provinces, Scotland, and Hong Kong. PIRLS and TIMSS are particularly focused on the learning that takes place in school and what and how teachers are teaching students. PISA is more focused on students' yield of learning that takes place inside **and** outside of school throughout the years.

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In recent rounds of the IAP studies, several U.S. states have had the opportunity to draw samples separate from the U.S. sample to benchmark their performance internationally. Florida participated in PIRLS 2011. Florida and North Carolina participated in TIMSS 2011 at grades 4 and 8. Alabama, California, Colorado, Connecticut, Indiana, Massachusetts, and Minnesota also participated in TIMSS at grade 8. In PISA 2012, Connecticut, Florida, and Massachusetts participated. It's important to note that state samples included public schools only.

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The PIRLS and TIMSS grade 4 target populations consist of all students enrolled in the grade that represents 4 years of schooling, counting from the 1st year of the International Standard Classification of Education, or ISCED, Level 1, providing that the mean age at the time of testing is at least 9 and ½ years. ISCED levels assist countries in providing comparable, cross-national data. ISCED Level 1 refers to primary education, and in the United States elementary school (grades 1 through 6) is classified at this level.

All items are assembled into blocks or clusters. Then, the blocks are rotated across a set number of test booklets, with each student completing one booklet. Consequently, no student receives all items, but each item is answered by a representative sample of students.

For PISA, the target population consists of students enrolled in education institutions located within the national education system, in grade 7 and higher, who are 15 years and 3 months to 16 years and 2 months of age at the beginning of the testing period. Individuals schooled in the home, workplace, or out of the education system are excluded from the target population in PIRLS, TIMSS, and PISA.

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This table describes the samples from the most recent administration of the three main IAP studies.

In 2011, 53 education systems participated in PIRLS at grade 4. Participants included 370 U.S. schools and 12,726 U.S. students. In 2011, 57 education systems participated in TIMSS at grade 4 and 56 education systems participated at grade 8. In the U.S., 369 schools and 12,569 students participated at grade 4 and 501 schools and 10,477

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students participated at grade 8. It is important to note that both PIRLS and TIMSS sample intact classrooms.

In 2012, 65 education systems participated in PISA. Participants included 6,111 U.S. students from 161 schools. For all studies, the participating education systems included countries as a whole, as well as subnational entities such as states, provinces, and special administrative regions.

More details about the PIRLS, TIMSS, and PISA sampling designs are provided in the module titled 'Sample Design, Weights, Variance Estimation, IRT Scaling, and Plausible Values,' which can be accessed by clicking the underlined screen text, 'Samples.'

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All three IAP study assessments use a method known as multiple matrix booklet design, with a rotated block design to distribute the material among students. This is consistent with the method used by other large-scale assessments, such as NAEP. With this approach, no student takes the whole assessment. This reduces the test burden for each student, while also being able to ensure broad subject-matter coverage.

All items are assembled into blocks or clusters. Then, the blocks are rotated across a set number of test booklets, with each student completing one booklet.

The distribution of blocks across booklets links the booklets to enable the achievement data to be scaled using item response theory, or IRT, methods. This way, reliable and valid estimates of achievement can be obtained not for individuals, but for the target population.

More information about both the multiple matrix booklet design and IRT scaling can be found in a separate IAP studies' training module by clicking on the related underlined screen text.

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Now that you have general background information about each of the three main IAP studies; the slides that follow will describe the components of each of the three studies, as well as their frameworks and the additional resources available to help you effectively use the datasets for your analytic purposes.

You can click on one of the study titles above, which will take you directly to detailed information about the study of your choice. Or you will be automatically advanced to the next slide within the module, starting with PIRLS. At the end of each study section of the module, you will be provided with a button that will return you to this IAP Studies slide, from which you may either select another study detailed within the training module, or exit the module completely.

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The student paper-based assessment is given in two 40 minute parts, with a 5- to 10-minute break in between.

PIRLS background questionnaires are administered to collect information about students' home and school experiences with learning to read. Questionnaires have been administered to students, teachers, and school principals for all PIRLS administrations. In most other education systems besides the United States, a home, or parent, questionnaire has also been administered. PIRLS 2006 and 2011 included a curriculum questionnaire that provided information about the national context. This information provides an opportunity to evaluate the implementation of educational reforms or initiatives. In addition, a PIRLS Encyclopedia is published for each PIRLS administration, which provides system-level information for each participating education system regarding education policies and practices, teacher education requirements, and information on examinations and assessments used to measure achievement.

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PIRLS is designed to measure the reading achievement and reading behaviors and attitudes of 4th-grade students. It measures reading achievement through grade-specific curriculum knowledge. The assessment is organized around two purposes of reading: literary experience and acquire and use information.

Reading literacy is defined by PIRLS as the ability to understand and use those written language forms required by society and/or valued by the individual. Young readers can construct meaning from a variety of texts. They read to learn, to participate in communities of readers in school and everyday life, and for enjoyment. This definition goes beyond simply decoding and comprehending text to include a broad range of information-processing skills that adults use in accomplishing the range of tasks associated with work, home, and community contexts. In PIRLS, there is a distinction between reading for literary experience and reading to acquire and use information.

More information on the PIRLS framework can be accessed by clicking the underlined screen text, 'Framework'.

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PIRLS data can be used to learn more about many topics regarding fourth grade students' reading abilities and circumstances. For example, the data can be used to explore changes in fourth-graders' reading abilities across education systems and over time, student attitudes towards reading, school resources and priorities, and classroom learning environments.

You may now proceed to the next IAP study described in this module, or return to the 'IAP Studies' slide to select another study.

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TIMSS assesses fourth- and eighth-grade students in mathematics and science abilities using paper-based assessments. At 4th-grade, the assessment is given in two 36-minute parts, while in 8th-grade, the assessment is administered with two 45-minute parts. For both grades, a 5- to 10-minute break is given between the two parts and both constructed-response and multiple-choice items are included.

In addition to the math and science assessments given to students, supplementary information is obtained through the use of student, teacher, school, and curriculum questionnaires. Fourth-grade students receive a single version of the student questionnaire, but at 8th grade, there are two versions: an integrated science version (which is what the United States uses) and a separate science version (which is used in education systems that organize their science curriculum with different tracks). At 4th grade, there is a single questionnaire given to teachers of sampled students, while at 8th grade, there are separate questionnaires for the mathematics and science teachers of sampled students. There are separate versions of the school and curriculum questionnaires for 4th and 8th grades. The school questionnaire is generally filled out by school principals. Information collected from students, their teachers and schools is summarized in composite indices focused, in particular, on the relationship between mathematics and science achievement and the home, classroom, and school environment.

In addition, the TIMSS Encyclopedia is published for each TIMSS administration, which provides system-level information for each participating education system regarding education policies and practices, teacher education requirements, and information on examinations and assessments used to measure achievement.

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TIMSS is designed to measure the mathematics and science achievement, as well as learning behaviors and attitudes of 4th- and 8th-grade students. It measures mathematics and science achievement through grade-specific curriculum knowledge.

For both subjects, the TIMSS assessment is organized around two dimensions: Content domains and Cognitive domains. This table shows the different content domains for each grade and subject. The Cognitive domains remain the same across grades and subjects.

More information on the TIMSS framework can be accessed by clicking the underlined screen text, 'Framework'.

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The 1995 TIMSS Videotape Study was designed as the first study to collect videotaped records of classroom instruction from national probability samples in Germany, Japan, and the United States. This study was used to gather more in-depth information about

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the context in which learning takes place as well as to enhance understanding of the statistical indicators available from the main TIMSS study.

An hour of regular classroom instruction was videotaped in a subsample of 8th-grade mathematics classrooms that were included in the assessment phase of TIMSS in each of the three education systems. In Japan, however, the videotaping was usually done in a different class, selected by the principal.

The 1999 TIMSS Videotape Study was expanded in scope to examine national samples of 8th-grade mathematics and science instructional practices in six nations. These included Australia, the Czech Republic, Japan, the Netherlands, Switzerland, and the United States. One subnational education system, Hong Kong-China, was also included in the 1999 TIMSS videotape study. Four education systems—Australia, the Czech Republic, the Netherlands, and the United States—participated in both the mathematics and science components of the study. Hong Kong-China and Switzerland participated in only the mathematics component, and Japan participated in only the science component.

You can obtain more information about the TIMSS video studies by clicking the underlined screen text, [TIMSS Videotape Studies.](#)

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TIMSS addresses three conceptual levels of curriculum. The intended curriculum is composed of mathematics and science instructional and learning goals as defined at the system level. The implemented curriculum is the mathematics and science curriculum as interpreted by teachers and made available to teachers. The attained curriculum is the mathematics and science content that students had learned and their attitudes toward these subjects. To aid in interpretation and comparison of results, TIMSS also collects extensive information about the social and cultural contexts for learning, many of which are related to variations among the education systems.

To collect data about how the curriculum is implemented in classrooms, TIMSS administers a broad array of questionnaires. These questionnaires were administered at the country level on decision making and organizational features within the education systems. The students who were tested answered questions pertaining to their attitudes toward mathematics and science, classroom activities, home background, and out-of-school activities. The mathematics and science teachers of sampled students responded to questions about the teaching emphasis on the topics in the curriculum frameworks, instructional practices, textbook use, professional training and education, and their views on mathematics and science. The heads of schools responded to questions about school staffing and resources, mathematics and science course offerings, and support for teachers. In addition, each education system filled out system-level information for the encyclopedia.

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TIMSS data can be used to learn more about many topics regarding fourth- and eighth-grade students' understanding of mathematics and science concepts, as well as their broader learning contexts. For example, the data can be used to see differences in students' mathematics and science performance across education systems and changes over time, student perceptions of mathematics and science, school resources and priorities, and classroom learning environments.

You may now proceed to the next IAP study described in this module, or return to the 'IAP Studies' slide to select another study.

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Each PISA administration focuses on one subject (reading, mathematics, or science) in particular, although all three subjects are assessed. Each subject is a major domain every 9 years. For example, as seen in the table here, in 2000 and 2009, the focal subject was reading literacy, and therefore it appears in all capital letters. In 2003 and 2012, mathematics literacy was the focal subject. In 2006 and 2015, science literacy was the focal subject. Subscales are assessed only for the focal subject for each administration. PISA also includes measures of general or cross-curricular competencies. For example, a portion of the 2003 assessment was devoted to general problem-solving and PISA 2012 included computer-based problem-solving. In PISA 2012, the U.S. participated in the international options of computer-based assessment in math and reading, as well as financial literacy. The PISA 2015 assessment was entirely computer-based and focused on science. It also assessed reading, mathematics, and collaborative problem-solving, as well as financial literacy as an optional assessment.

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PISA 2012 was composed of a main paper-based student assessment, as well as an optional computer-based student assessment in which the United States participated. The paper-based assessment assessed students on their mathematics, science, and reading literacy skills. In addition to the main subjects, some education systems, including the United States, participated in an optional financial literacy assessment, which was administered as part of the paper-based assessment and included both multiple-choice and constructed-response items. The paper-based assessment was given in four 30-minute parts, with two short breaks of approximately 5 minutes—one after the first hour and another after the second hour.

The computer-based assessment assessed a subset of students on mathematics and reading literacy, as well as problem-solving. It was administered in two 20-minute parts and also included both multiple-choice and constructed-response items. The interactive nature of computer-based assessment allowed PISA to assess students in novel contexts that are not possible with a traditional paper-based format. Thirty-two education systems (out of sixty-five), including the United States, administered

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computer-based assessment in mathematics and reading, and forty-four education systems, including the United States, administered computer-based assessment in problem-solving.

PISA background questionnaires are also administered to collect information about students' home and school experiences with learning. Questionnaires have been administered to students and school principals for all PISA administrations. In most other education systems besides the United States, a parent questionnaire has also been administered.

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In contrast to PIRLS and TIMSS, which are concerned with grade-specific curriculum knowledge, the objective of PISA is to measure the yield of learning, or what skills and competencies 15-year-old students have acquired and can apply in reading, mathematics, and science to real-world contexts to meet the challenges of today's knowledge-based societies. The literacy concept emphasizes the mastery of processes, the understanding of concepts, and the application of knowledge in real-world contexts. By focusing on literacy, PISA is not a direct measure of grade-specific curriculum. It draws not only from school curricula but also from learning that may occur outside of school.

More information on the PISA framework can be accessed by clicking on the underlined screen text, 'Framework.'

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The PISA Framework provides specific definitions of mathematics, science, and reading literacy. Each definition underlines the idea that PISA is not a curricular test, but rather seeks to find out if students towards the end of compulsory schooling are prepared to apply knowledge and skills in real-world contexts.

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The PISA 2012 framework also includes definitions of problem solving competency and financial literacy.

In 2012, a computer-based assessment in general problem solving was administered in 44 education systems, including the United States. Computer-based assessments in mathematics and reading were offered as optional assessments for participating countries. Thirty-two education systems (out of 65), including the United States, chose to administer them. In these education systems, a subset of students who took the paper-based assessment was also assessed on computer. The interactive nature of computer-based assessment allowed PISA to assess students in novel contexts that are not possible with a traditional paper-based format. For instance, the computer-based mathematics assessment was designed to measure.

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PISA data can be used to learn more about many topics regarding 15-year-old students' understanding of mathematics, science, and reading literacy concepts in real life contexts. PISA can also be used to see differences in students' applications of knowledge in real-world contexts, student attitudes and learning strategies, school resources and priorities, and classroom learning environments.

You may now proceed to the next IAP study described in this module, or return to the 'IAP Studies' slide to select another study.

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This module has provided you with an introduction to PIRLS, TIMSS, and PISA, and described the components of each study, study objectives, the years in which data were collected, the different target populations, and the samples of each study. Additionally, this module has highlighted topics for which data are available for analyses.

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Important resources that have been provided throughout the module are summarized in this slide along with the module's objectives for your reference.

The subsequent IAP studies training modules contained within this system discuss some of these topics in greater detail and address questions about how to effectively use the datasets for your analytic purposes.

You may now proceed to the next module in the series, or click the exit button to return to the landing page.