5 IMPLEMENTATION OF THE MODULE

5.1 Introduction

This section explores different parameters to consider with regard to the implementation of the Module, including suggested respondents; options for implementing the Module, for example with the PISA-based Test for Schools; possible formats for the Module instruments;; and sampling issues. Drawing on previous sections, a number of focus areas and sample questions are presented for inclusion in the Module instruments. As described in the Introduction, a "Module" is defined as a resource, which when applied, will provide schools with advice on a particular area of the learning environment, for example the physical learning environment. So each Module is modular in the sense that it is composed a specific set of questions, which can be implemented to support school improvement efforts:

- As part of the contextual information collected alongside the PISA-based Test for Schools, in accordance with the agreed guidelines for the implementation of the test (OECD, 2013a);

- With other national or sub-national student assessments; or

- As a self-evaluation instrument by individual schools.

The section concludes by presenting some options for reporting results from the study and reflections on the future development of the LEEP Modules.

5.1 Possible respondents

In order to best capture the "lived experiences of space" in this Module, three "voices" should be heard:

- Students;

- Teachers; and

- School principals.

It is expected that some respondents may be more appropriate than others to address the issues raised in this section (e.g. about leadership, preparation of teachers to use new spaces, etc.), while asking different respondents similar questions may result in some interesting comparisons (e.g. about connectivity, safety, etc.). While the use of questionnaires is proposed as the main data collection tool, the use of other methods, such as interviews, focus groups and observation involving students, teachers and the school principal, may be useful as a follow up to data analysis for example to assist the school to address the issues and challenges to school improvement identified in the data analysis.

5.2 Options for implementing the Module

5.2.1 Using the Module with the PISA-based Test for Schools involving students and school principals

In PISA and other international surveys, questionnaires have been the main means of collecting data on student outcomes and perceptions on the learning environment for the purpose of international comparison. Respondents are normally asked to choose an option from a list or to indicate on a scale known as a Likert scale. This scale gives respondents the opportunity to indicate, for example, how much they agree or disagree with certain statements.

For students, the PISA test consists of a two-hour cognitive assessment in reading, mathematics and science followed by a 30-minute background questionnaire. The same timing is used by the PISA-based Test for Schools. Contextual information is obtained from students and principals using background questionnaires known as the "student" and "school" questionnaires, respectively. Core components of the background questionnaires are included in every cycle of PISA and in the questionnaire for the PISA-based Test for Schools. There are also questions which focus on the major subject domain of assessment, which changes from cycle to cycle - in 2012 it was mathematics, while in 2015 it will be science. The types of questionnaires possible are:

- The *student questionnaire*: *In PISA this questionnaire* collects data about the student's home background including parents' occupation and education levels and language spoken at home as well as the student's attitudes to learning, including perceptions of teaching, the psycho-social classroom and school environment and self-concept. There are standard PISA indices calculated from the student questionnaire which can be replicated for the LEEP Module (for examples see p.115, OECD, 2010c).

- The *school questionnaire*: *In PISA this questionnaire* collects data from principals about school location, school size, teaching staff, physical and education resources of the school and the principal's perceptions of how resources are used and if there are particular hindrances to the education of the students in the school. In addition to the main student and school questionnaires, there are short optional questionnaires which countries can implement if they wish. These questionnaires include a parents' questionnaire, an ICT familiarity and perceived future educational careers. Full details of the existing PISA questionnaires are found in the *PISA 2012 Assessment and Analytical Framework: Mathematics, Reading, Science, Problem Solving and Financial Literacy* (OECD, 2013d). There are standard PISA indices calculated from the school questionnaire which can be replicated for the LEEP Module (for examples see p.122, OECD, 2010c).

- The *teacher questionnaire*: In the past, the OECD has successfully gathered data from teachers through its Teaching and Learning International Survey (TALIS). With a focus on lower secondary education in both the public and private sectors, TALIS examined important aspects of teachers' professional development; teacher beliefs, attitudes and practices; teacher appraisal and feedback; and school leadership in 24 participating countries (OECD, 2009a).

But teacher questionnaires has never been part of the PISA survey, mainly because in the standard PISA survey, the student sample is age-based, not class-based, meaning that the sample could be spread across grades and across classes within grades. In PISA, therefore, it can be difficult to link teachers to students with the aim of exploring successful teaching strategies or, in the case of LEEP, linking teachers' perceptions of the learning environment with student outcomes. However, a teacher questionnaire will be included as an option in PISA 2015.

In the PISA-based Test for Schools, it is more likely that students can be sampled in class groups and so a teacher questionnaire would yield significant data. An opportunity, therefore, arises with the LEEP Module to evaluate the relationship between teacher perceptions of the environment and their teaching style, self-concept and morale and how this informs their practice. It could also get teachers' views about their attraction to the school and teacher retention. There would probably be no need to restrict items for teachers to the 10 minutes suggested for students. In addition, there is the possibility of adapt the teacher questionnaire in PISA 2015 to the PISA-based Test for Schools and LEEP.

A proposed model of implementing the LEEP Module is to develop additional PISA-type questionnaire items for students and school principals. These items could be:

• Integrated into the existing PISA background (student and school) questionnaires. This would yield a large amount of data about the school, students, the teaching staff and the resources of the school, keeping in mind that any correlations observed are at the school level, not the student level. For a more detailed description of the information available from these sources please refer to Annex 1. The Module would thus need to be of a restricted length to ensure that the students are undertaking the test in conditions similar to PISA. It might reasonably be expected that the LEEP Module could be the same length as the optional ICT Familiarity Questionnaire which has 56 response points spread through 10 questions and which takes students 5-10 minutes to complete.

• Implemented independently, without the PISA background (school and student) questionnaires. Although this option would yield less data about other aspects of the school and student, more time could be devoted to the Module, say an additional 20 minutes per respondent. 5.2.2 Using the Module with other national or sub-national student assessment

Another model is to implement the Module with an existing national or sub-national cognitive assessment instrument, for example the National Assessment Program – Literacy and Numeracy (NAPLAN) in Australia, which is an annual assessment for students in Years 3, 5, 7 and 9 or Provincial Achievement Tests in Canada for students aged 3, 6 and 9. The PISA-based Test for Schools would therefore not be used as the cognitive assessment instrument. While this would not allow eventual cross-country comparison, it may be more convenient for countries to integrate the Module into existing evaluation and assessment frameworks.

5.2.3 Using the Module as a self-evaluation instrument

A further model would be to simply implement the Module independently of any other assessment. This would give schools and systems a prompt, detailed set of data pertaining to their physical learning environment which they could use for school improvement and use as a starting point for future assessments of the physical learning environment. Valuable information would still be obtained about perceptions of the physical learning environment. Should this independent Module be implemented the opportunity exists to increase the number of questions and the time set aside for administration.

5.3 Format of the Module

As described above, PISA background questionnaires are typically composed of multiple-choice questions, with some restricted open-ended questions. While the LEEP Module presents an opportunity to use qualitative research methods (e.g. interviews, focus groups, observation, visual methodologies, see Blackmore, et al., 2007) with the cognitive assessment instruments, allowing a more profound understanding of different outcomes and the nuanced relationships, practices and interactions in the physical learning environment - which cannot be captured by empirical data alone - these methods have

serious resource implications, both in terms of the cost of implementation, respondent burden and comparative analysis (see OECD, 2014). Therefore, it is proposed that the format Module comprise:

- Multiple-choice questions on a Likert scale to enable in-school comparisons;

- Some open-ended questions, which would provide anecdotal evidence from teachers, students and school principals; and

- Contextual questions in a separate questionnaire to record the details of the physical learning environment in which the student, teachers and school principals interact.

5.3.1 Open-ended questions

Although the PISA background questionnaires do use open-ended questions, these questions are structured or very limited in their response patterns - for example "What is your father's main job or what level of education did your mother reach?". The main issue with using open-ended responses is that there needs to be a very clear rubric to record the responses consistently across schools. The disadvantage is that this process is more expensive and time-consuming because coders must be trained and employed to assess each response.

5.3.2 Collection of contextual data

It may be useful to collect information relating to "objective" aspects of the physical learning environment, which can be correlated with performance data and also compared with student, teacher and other perceptions of for example accessibility, comfort or health, and other non-cognitive outcomes, for example, health and wellbeing. The test administrator could complete a short questionnaire about the building where the test is taking place. In addition to allocating the correct booklets to the individual students, test administrators have to record the timing of the assessment, the number of students present and any problems that may contribute to a non-standard administration of the test. Currently for PISA, the ratio is a maximum of 43 students per test administrator, which means that there are two for the target of 85 students. Data collected would focus on built environment and the organisation of learning and pedagogy.

Built environment

- Comfort and health, e.g. complaints about bad air, number of days sick leave of staff & students due to health reasons;

- Efficiency. i.e. age of the building compared to money spent on renovation during the x years period etc.;

- Measures of air quality, temperature, light and humidity;

- School size, location and distance from home;

- Table/chair size;

- Wifi wideband speed;

- ICT infrastructure, e.g. whiteboards, Ipads, netbooks;

- Environmental features, e.g. solar power, water tanks, drought tolerant plants, kitchen gardens;

- Maintenance (expenditure, recent work, needs);

- Acoustics in large open spaces;

- Flows of space indoor/outdoor;

- Leisure space e.g. cafeterias/cafes; sporting facilities etc;

- Disability access; and

- Aesthetic features, e.g. artwork.

Organisation of learning and pedagogy

- Inclusion of spatial literacy in the curriculum e.g. curriculum policy or documents;

- Shared community spaces e.g. library, hall, sporting facilities;

- Community use of space, e.g. parents visiting the school, community organisations use of facilities?;

- Use of outdoor space, e.g. outdoors on sports fields, or if no sports fields;

- Source of funding for new facilities and maintenance e.g. parent councils, local government. NGOs, rental;

- Traditional classrooms and/or learning centres e.g. multi-age spaces;

- Specialisms e.g. drama, sport, science and technology; and

- Partnership with or other organisations e.g. industry.

5.3.3 Test format

The PISA-based Test for Schools has been administered so far as a paper-based test. However, consideration for the future implementation of the test will include the possibility of test delivery by computer via web-based technology. This mode of delivery has the advantage of directly capturing the data without the need for a separate data entry step, leading to faster, more efficient analysis of the data. Although there are some upfront costs in developing the system, experience from PISA suggests that the benefits are worthwhile (OECD, 2013d).

5.4 Sampling standards using PISA-based Test for Schools

5.4.1 Sampling schools

Sampling in the PISA-based Test for Schools is different to the sampling in the standard PISA cycle where schools are chosen randomly and then the required number of 15-year-olds are randomly chosen to participate. In the PISA-based Test for Schools, the selection is not random because it is the school and/or region choosing to participate. So the sample could include schools that have been recently built, partially

or fully, renovated, or without any new buildings or renovation. Any questions asked should specify which applies.

To ensure that there is a sufficient number of item responses it would be expected that each student undertaking the PISA-based Test for Schools would complete the cognitive assessment, background questionnaires and Module instruments. The PISA Technical Standards define all the requirements that countries need to meet so that their data will be included in the international database. These standards include translation processes, test administration procedures, print quality and sampling requirements. For PISA, the accepted sampling standards are a participation rate of 85% of selected schools and 80% of selected students from within those schools. These requirements are put in place to guarantee comparability of results across the countries. There is also a set of technical guidelines applying to the administration of the PISA-based Test for Schools to guarantee compatibility to the regular PISA surveys, which would apply in the case of the LEEP module. In the case of the PISA-based Test for Schools, the guidelines stipulate a sample size of 75 age-eligible students per school, with no fewer than 49 students in the case of smaller schools.

5.4.2 Sampling learning settings

Although the sampling process for PISA and the PISA-based Test for Schools does not include "type of classroom" (e.g. technology areas, common spaces, library, science, arts etc.) as a particular stratum, in the LEEP Module, it will be possible to provide information on classroom type for students, enabling the linking of student outcomes to a particular educational space. It could also be possible to ask students about their perceptions of a range of classrooms, in addition to their perceptions of the whole-school environment.

Because the PISA cognitive test is a combination of reading, mathematics and science, it would be instructive to link a student's outcomes in science, for example, to the student's perceptions of the science environment. The Module instrument(s) should therefore be quite specific about targeting different subject areas.

5.5 Focus areas, themes, possible instruments and outcomes for students, teachers and school principals

This section presents the focus areas and themes for the Module and outcomes for three respondent groups (students, teachers and school principals). The objective of this section is to assist the development of instruments for the Module. Selection of the focus areas was based on the following criteria:

- The information did not already exist in PISA background questionnaires (see Annex 1); and

- Potential for the enriching evidence base.

Some themes are explored by multiple respondents in order to compare responses – for example access and safety; comfort; affordances for teaching; and professional development opportunities – while other themes required only one particular respondent to address a theme, for example the issues of affordances for students, community collaboration and policy context. The themes address issues around both pedagogical and environmental concerns, all of which can be mapped against the non-cognitive outcomes identified in Table 5.1.

While most of the focus areas identified can be implemented in schools at the different phases identified in Section 2 - designing the learning environment; preparing for and transitioning into the new learning environment; consolidation of the new physical learning environment; and

sustainability/evaluation of the physical learning environment over time with different teacher and student cohorts - it may be useful in order to gain an understanding of time and change over time by posing key questions to students, teachers and school principals related to the physical learning environment. This could be completed following data analysis, for example, using interview or focus groups. For example:

- What has changed over time and why?

- With what effect?

- What has stayed the same and why?

5.5.1 For students

The focus areas identified for students address environmental issues, but also some important issues related to engagement in learning, preferred spaces for learning and concern for the environment (Table 5.1). "Affordances for students" (Gibson, 1977) can be defined as the conditions produced by the physical learning environment for students, which can mediate relationships that can improve effectiveness along a range of indicators (cognitive and non-cognitive) and the quality of relationships.

Table 5.1 Focus areas, themes and outcomes for the LEEP Module
addressed to *students*

Focus areas	Themes	Outcomes
Access and safety	Accessibility and safety of the learning environment	Health and wellbeing
Affordances for students	Students' enjoyment of working in the (new) physical learning environment	Affective
Appearance	General appearance of the school building and classrooms	Affective
Comfort	Quality of the physical learning environment in terms of temperature, humidity, lighting (natural and artificial) and acoustics (i.e. noise levels)	Health and wellbeing
Concern for the environment	Involvement in activities related to environmentally sustainable practices inside or outside class	Learning
Connectivity	Frequency and ease of access to ICTs in class; availability and use of devices such as IPad and IPhone in class	Learning
Flexibility of furniture and space	Moveability, agility and movement of furniture and ICT to suit the learning activity; comfort in classrooms where there are moveable tables and chairs; sliding glass or operable walls/doors; comfort when moving around the classroom	Health and wellbeing; Learning
Outdoor spaces, social spaces, favourite spaces and shared visual workspace	Frequency and enjoyment of playing games outdoors; of sitting in a quiet place outdoors; of being in class outdoors; and of being in particular parts of the school; frequency of display of students' material; connectivity to the outdoors	Affective; Social
Specialist spaces	Preferred specialist spaces (e.g. arts, science, technology, etc.); expected and actual use of specialist spaces for the purpose for which they were designed.	Affective; Learning

5.5.2 *For teachers*

The focus areas identified for teachers share some commonalities with students with regard to environment-related issues in the school. Other more pedagogy-related themes are also addressed to school principals. "Affordances for teaching (and with technology)" is defined in Section 2 as the conditions (Gibson, 1977) produced by the physical learning environment, which can mediate relationships that can improve teaching along a range of indicators (cognitive and non-cognitive) and the quality of relationships.

There may also be a relationship between the profiles of teachers – their experience, qualifications, training, age and gender – and some of the themes identified in Table 5.2. For example, the extent to which the (new) physical learning environment – and/or the school leadership – encourages teachers to use new or innovative teaching methods (such as team teaching) and/or materials, employ more learner-centred approaches in general; work with other colleagues in teams; rearrange/adjust furniture/doors/ walls; change lesson plans or timetabling to suit the new spaces; or use ICTs (such as whiteboards, laptops and IPads) to better support teaching and learning.

Table 5.2 Focus areas, themes and possible outcomes for the LEEP Module addressed to *teachers*

Focus areas	Themes	Outcomes
Access and safety	Accessibility and safety of the learning environment	Health and wellbeing
Affordances for students	Behaviours of students in the (new) physical learning environment, such as more collaboration with peer-to-peer learning, more self-directed learning, greater engagement and self-efficacy, greater student choice in preferred learning space etc.	Affective; Behavioural; Learning; Social
Affordances for teaching (and with technology)	Extent to which the (new) physical learning environment – and/or the school leadership – encourages teachers to use new or innovative teaching methods (such as team teaching) and/or materials, employ more learner-centred approaches in general; work with other colleagues in teams; rearrange/adjust furniture/doors/ walls; change lesson plans or timetabling to suit the new spaces; use ICTs (such as whiteboards, laptops and IPads) to better support teaching and learning	Affective; Learning
Appearance	General appearance of the school building and classrooms	Affective
Comfort	Quality of the physical learning environment in terms of temperature, humidity, lighting (natural and artificial) and acoustics (i.e. noise levels), extent of user control over some of these elements	Health and wellbeing
Connectivity	Frequency and ease of access to ICTs in class; speed of network, bandwidth, currency of devices used	Learning
Equity	Allocation of space for different groups (e.g. ESL, SEN, adult re-entry students, indigenous etc.); actual use of space by different groups, including consideration of the challenges faced by particular groups of students and spaces that are dominated by particular groups of students	Behavioural; Learning
Flexible use of furniture and space	Ease of movement, agility and actual movement of operable walls, sliding glass walls and doors, furniture and ICT to suit the	Health and Wellbeing; Learning

	learning activity; comfort in classrooms where there are moveable tables and chairs; comfort when moving around the classroom	
Participation in design	Participation of teachers in the design of (new) spaces	Affective; Social
Professional development	Professional development (or related) activities to prepare teachers for pre- and post-occupancy; sense of professional efficacy	Affective; Learning
Recruitment and retention of teachers	Potential of new facilities to attract students and teachers to and retain teachers in the school; selection criteria for new teachers to teach in "Next Generation Learning Environments"	Affective; Health and Wellbeing; Learning

5.5.3 For school principals

The focus areas identified for school principals draw on some of the same areas as those for teachers and students (e.g. affordances for both teachers and students, professional development and participation in design), but also addresses policy-related issues relating to what is termed the "enabling" or "disabling" school policy environment and issues around community and parental engagement, and leadership and innovation (Table 5.3). *Enabling* policies are those that 1) support the core work of teaching and learning, 2) recognise the need to develop cognitive and other outcomes and 3) impart a level of professional autonomy for teachers and schools to address the specific needs of their students and communities. *Disabling* policies are those that are counterproductive to this core work, focusing on a narrow range of cognitive outcomes and standardisation (Macbeath, 2008; McNeil, 2009).

Table 5.3 Focus areas, themes and possible outcomes for the LEEP Module addressed to *principals*

Focus areas	Themes	Outcomes
Affordances for students	Differences in observed behaviours of students and teachers in the (new) physical learning environment, such as more collaboration, more self-directed learning, greater engagement, self-efficacy, etc.	Affective, Behavioural
Affordances for teaching (and with technology)	Extent to which the new physical learning environment – and/or the school leadership – encourages teachers to use new or innovative teaching methods and/or materials, employ more learner-centred approaches in general; work with other colleagues in teams; greater collaboration in general; rearrange furniture, change lesson plans or timetabling to suit the new spaces; use ICTs (such as whiteboards, laptops and IPads) to better support teaching and learning	Affective, Learning
Allocation and use of space	Allocation and use of different spaces for different student age groups and teacher groups over time; use of outdoor spaces for learning	Health and wellbeing; Learning; Social
Comfort	Quality of the physical learning environment in terms of temperature, humidity, lighting (natural and artificial) and acoustics (i.e. noise levels)	Health and wellbeing
Community collaboration (e.g. industry,	Collaboration with new community stakeholders (e.g. industry, interagency, etc.); involvement of the school in neighbourhood renewal; use and encouragement to use common spaces in school	Affective; Social

interagency collaboration)	hours; design of school zoning to facilitate community use	
Leadership and innovation	Responsibilities for learning and innovation in the school; structures and processes in place to support teacher leadership and professional development especially in regard to the physical learning environment	Affective; Learning
Outdoor spaces, social spaces, favourite spaces and shared visual workspace	Response of students to (new) spaces (indoor and outdoor spaces, specialist spaces, flows between spaces); intended vs actual use of spaces, especially multi-purpose and single purpose spaces	Affective; Health and wellbeing
Parental engagement	General interest and involvement of parents (in financial, expertise, labour terms) pre- and post-occupancy; use and encouragement to use common spaces in school hours; education of parents in next generation learning environments concepts, including evidence of how effective they are in affording better teaching and learning outcomes	Affective, Behavioural; Social
Participation in design	Participation of principals in the design of the new spaces; extent to which principals include leadership team; and extent to which this team includes classroom teachers; train the trainer programs on NGLE's	Affective; Social
Policy context	"Enabling" or "disabling" school policy environment with regard to additional funds, personnel, planning, professional development, integration of ICT, focus on standardised tests (cognitive) or non-cognitive outcomes for new spaces	
Professional development	Professional development (or related) activities to prepare school principals and teachers for occupancy and during occupancy; general responsibility for professional development activities; involvement of teachers in professional learning networks to share ideas about space	Affective; Behavioural; Social

5.6 Implementation schedule for the Module instrument(s)

This Framework should provide sufficient information to allow for the detailed development of the Module instrument(s). This process is undertaken by experts in the field of instrument development, who will work closely with the OECD Secretariat, the authors of this Framework and the OECD Group of National Experts on Effective Learning Environments.

In test development there are three levels:

- Initial piloting with a small group;

- Field trial with a reasonable number; and

- Final instrument.

A field trial is necessary to check that the items which have been developed are high quality, well targeted and can be completed in the time allocated. Table 5.4 presents an implementation schedule for the drafting and field trial of the Module instrument(s).

Table 5.4 Possible implementation schedule for the Module instrument(s)

Date	Task
December 2013	Agreement reached on the Framework for the LEEP module
January 2014	Terms of Reference drawn up for engaging contractor to draft the LEEP Module instruments
February 2014	Call for Tenders issued for drafting the LEEP Module instruments
March 2014	Contractor selected
April-May 2014	Initial drafting of the LEEP Module instruments Review of items and subsequent revision
June 2014	Meeting of the GNE to discuss draft LEEP Module instruments
June 2014	Piloting with a small group of respondents and subsequent revision
September 2014	Finalisation of field trial LEEP Module instruments
October 2014	GNE meeting
November-December 2014	Field trial
January 2015	Field trial analysis and final item selection

5.7 Reporting results

One of the biggest challenges after completing the LEEP module is to report the results in ways that will lead to policy discussion and subsequent school improvement. The central aim of the reporting and dissemination processes are to help the public and interested parties such as schools, communities and policy makers understand what the Module is about, what is contained in it, and how it could be used for school improvement purposes. However, there are two important caveats with regard to the implementation of the Module instruments:

• There will be no international benchmarking with results from the LEEP module because the questionnaire items do not yet exist in the main PISA study.

• The LEEP Module is designed to assist schools. It does therefore not seek to address the system level.

In 2012, each school participating in the pilot of the PISA-based Test for Schools received a report for their school, which included detailed comparisons of the situation in an individual school and how the school compared with schools nationally and internationally (OECD, 2012). Because it would not be possible to provide international benchmarks, reporting from the LEEP module can be focused in different ways, and by using different reporting tools. Aschool report, for example, would rather include results and provide recommendations to the school for school improvement, set in the specific context of the school, and its issues and challenges regarding the effectiveness and efficiency of the physical learning environment.

In the future, an interactive web-based tool could locate statistical and contextual information about schools and compare them with statistically similar schools in the country. A related option is to create a platform that also provides discussion forms, showcases good practice and promotes information sharing related to the results and recommendations for schools from the Module. It may be possible to adapt an existing Database of Best Practice in Education Facilities Investment to this end (http://edfacilitiesinvestment-db.org/).

5.8 Future development

The development, testing and implementation of this Module and the way results are reported is being shaped by the people who will use this tool, and they are the best placed to evaluate the Module's impact and relevance as a tool for school improvement. "Impact" could be measured by the initiation of a conversation or discussion, which may evolve over time to a policy-level debate. The objective is to use this collaborative process to develop or adapt other modules, and to monitor school improvement initiatives over time. As described above, a comprehensive database would provide a useful reporting tool, which could develop over the years as the LEEP modules are developed and refined.

5.8.1 Starting a discussion…

One important measure of the impact of the Module is the extent to which it generates dialogue and learning in and between schools on issues related to the learning environment. This could take the form of professional (and other) visits to schools for research projects; regional workshops or discussion forms, or live policy debates.

5.8.2 Developing other modules

This LEEP Module on the Effectiveness and Efficiency of the Physical Learning Environment is the first attempt at developing tailored methodological and reporting tools using a collaborative multi-disciplinary approach to support benchmarking and school improvement efforts in different countries. If schools and education authorities find this Module a useful tool for school improvement and wish to continue this work through LEEP, the Secretariat will develop, implement and use additional modules. Other modules will extend the range of learning environment data that can be used to evaluate cognitive and non-cognitive outcomes. The Group of National Experts on Effective Learning Environments (GNE) will oversee this work and advise the Secretariat on possible areas of interest for future research.

5.8.3 Measuring change over time

The LEEP module gives schools the opportunity to track the effectiveness of the physical learning environment over a period of years. It would be instructive to learn how student perceptions of their physical learning environment change before and after they occupy a new building. While the same students are not assessed from one year to the next, the opportunity exists for similar students to assess the same physical environment from year to year. Any changes in the environment could be linked to student outcomes, so the emphasis is about ongoing redesign and maintenance of quality. To measure these changes it will be necessary to ensure that some parts of the LEEP instrument remain

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ANNEX 1: EXISTING DATA AVAILABLE FROM THE OECD STUDIES PISA AND TALIS

OECD Programme for International Student Assessment

In addition to cognitive data available for the subject domains reading, mathematics, science, problem solving and financial literacy, PISA collects contextual data from the students and principals. The student questionnaire focuses on home background, attitudes to learning and perceptions of classroom and school. the school questionnaire completed by the principal yields information about the school, its size and location, the principals' perceptions of teachers and any barriers perceived. The taxonomy of outcomes and predictive factors is summarised in Table 6.1 of the publication, *PISA 2012 Assessment and Analytical Framework: Mathematics, Reading, Science, Problem Solving and Financial Literacy* (OECD, 2013d).

Table 6.1
Two-dimensional taxonomy of educational outcomes and predictive factors

	Input	Processes	Outcomes
Students	Gender, grade level, socio-economic status Educational career, grades Immigration background, family environment and support ICT experience, attitudes, skills Openness, problem-solving styles	Attendance/truancy Outside-class activities - e.g. participation in after-school programmes Motivation, engagement Learning and thinking strategies, test taking strategies Learning time (including homework and private tuition)	Mathematical performance Mathematics-related attitudes, beliefs and motivation General school-related attitudes and behaviour, e.g. commitment, truancy Learning motivation, educational expectations
Classrooms	Class size, socio-economic background and ethnic composition Teacher education/training, expertise	Quality of instruction: structure, support, challenge Opportunity to learn: implemented curriculum, assigned tasks, mathematics-related activities Instructional time, grouping, assessment and feedback	Aggregated student variables
Schools	Socio-economic background and ethnic composition Affluence of the community School funding, public vs. private School size Parental involvement	Achievement orientation, shared norms, leadership, teacher morale and co-operation, professional development Admission and recruitment policies, tracking, course offerings/school curriculum, evaluation Teacher-student relations, supportive environment	Aggregated student variables Promotion/retention and graduation rates Attendance
Countries (Systems)	Economic wealth, social (in)equality Diversity policies	School funding, tracking and allocation, policies for professional teacher development, support for special needs and language minority students, hiring and certification policies Accountability and evaluation policies, locus of decision making	Aggregated student variables Average graduation level

PISA Student Questionnaire

In addition to ensure that PISA can measure changes across time, there is a core section of the questionnaires which is included in all cycles of PISA. For the student questionnaire the core section is described in Table 6.3 of the publication, *PISA 2012 Assessment and Analytical Framework: Mathematics, Reading, Science, Problem Solving and Financial Literacy* (OECD, 2013d).

Table 6.3
Student questionnaire: Common part

Question nº	Description
ST01	Grade
ST02	Country study programme
ST03	Age of student
ST04	Sex of student
ST05	Attend <ISCED 0>
ST06	Age at <ISCED 1>
ST07	Grade Repeating
ST08	Truancy - Times late for school
ST09	Truancy - Days unexcused absence
ST115	Truancy - Times skipped classes
ST11	Family structure
ST12	Mother's occupation (ISCO); Component of ESCS
ST13	Mother's educational level – Schooling (ISCED); Component of ESCS
ST14	Mother's educational level – Post school (ISCED); Component of ESCS
ST15	Mother's current job status; Component of ESCS
ST16	Father's occupation (ISCO); Component of ESCS
ST17	Father's educational level (ISCED) – Schooling (ISCED); Component of ESCS
ST18	Father's educational level (ISCED) – Post school (ISCED); Component of ESCS
ST19	Father's current job status; Component of ESCS
ST20	Immigrant background
ST21	Age of arrival in test country
ST25	Language spoken at home
ST26	General home possessions plus country-specific wealth items; Component of ESCS
ST27	Number of certain possessions in household; Component of ESCS
ST28	Books at home

For PISA 2012, where mathematics was the major domain of assessment most of the remaining questions ask about the students' attitudes and self-concept with respect to mathematics. Questions are also asked about the amount of time that students spend on mathematics inside the classroom and at home. The questions are listed in Table 6.4 of the publication, *PISA 2012 Assessment and Analytical Framework: Mathematics, Reading, Science, Problem Solving and Financial Literacy (OECD, 2013d).*

ST29	Intrinsic and Instrumental Motivation for Mathematics	ST42	Mathematics Self-Concept (Q2, 4, 6, 7, 9); Mathematics Anxiety (Q1, 3, 5, 8, 10)	ST53	Learning Strategies (Control vs. Elaboration vs. Memorisation)
ST35	Subjective Norms	ST77	Teacher Support in Mathematics Class	ST55	Attendance of Out-of-School-Time Lessons
ST37	Mathematics Self-Efficacy	ST79	Teacher Behaviour: - Teacher Directed Instruction - Formative Assessment - Student Orientation	ST57	Total Hours of Out-of-School Study Time
ST43	Perceived Control of Mathematics Performance	ST80	Cognitive Activation in Mathematics Lessons	ST61	Experience with Applied Mathematics Tasks (Q1, 4, 6, 8); Experience with Pure Mathematics tasks (Q5, 7, 9)
ST44	Attributions to Failure in Mathematics	ST81	Disciplinary Climate	ST62	Familiarity with Mathematics Concepts
ST46	Mathematics Work Ethic	ST82	+ Anchoring Vignettes	ST69	Min in <Class Period>
ST48	Mathematics Intentions	ST83	Mathematics Teacher Support	ST70	N° of <Class Period> per Week
ST49	Mathematics Behaviour	ST84	+ Anchoring Vignettes	ST71	N° of All <Class Period> a Week
ST93	Perseverance	ST85	Mathematics Teacher's Classroom Management	ST72	Class Size
ST94	Openness for Problem Solving	ST86	Student-Teacher Relations	ST73	Experience with Word Problems
ST96	Problem-Solving Strategies (SJT)	ST87	Sense of Belonging to School	ST74	Experience with Procedural Tasks
ST101	Problem-Solving Strategies (SJT)	ST88	Attitude towards School: Learning Outcomes	ST75	Experience with Pure Mathematics Reasoning
ST104	Problem-Solving Strategies (SJT)	ST89	Attitude towards School: Learning Activities	ST76	Experience with Applied Mathematics Reasoning

PISA School Questionnaire

The principals respond to a 30 minute questionnaire which covers the following topics:

1. Structure and organisation of the school - including questions about whether the school is public or private, funding sources, the characteristics of the local community and whether there are competing schools in the neighbourhood.

2. The student and teacher body - focusing on the student enrolment numbers and number of teachers employed.

3. The school's resources - particularly computer resources and an assessment of whether a lack of some resources (human and physical) is hindering student learning.

4. The school's instruction, curriculum and assessment - principals are asked about policies relating to ability grouping, provision of extra-curricular activities, how assessments are used results are published and whether additional classes in mathematics are offered.

5. School climate - the principals are asked about their perceptions of students and teachers at the school (including issues such as truancy, teacher absenteeism, teacher-student relations), parental expectations and involvement, as well as teacher morale and teacher appraisal.

6. School policies and practices - including admission policies, the degree of autonomy the principal has and the general management style employed.

7. Financial education at the school - the principals are asked about the level of financial education in school, whether or not it is compulsory and where it lies in the curriculum.

OECD Teaching and Learning International Survey

The OECD's first Teaching and Learning International Study (TALIS) took place in 2008 with results reported in *Creating Effective Teaching and Learning Environments: First Results from TALIS*. (OECD, 2009a). TALIS is a survey of principals and teachers which yields extremely valuable information and focused on the following areas:

Principal questionnaire

1. *Principal background information* - including age, gender, qualifications and experience as a teacher and as a principal.

2. *School background information* - including questions about whether the school is public or private, funding sources, the characteristics of the local community, number of students and teachers at the school, broad background characteristics of the students and the admission policies at the school.

3. *School management* - including questions about how the principal manages the school, the teachers and the students. Principals responded to questions about leadership style, the use of assessments, time management and evaluation of the school.

4. *Teacher appraisal* - including an estimation of how frequently this took place, who carried out the appraisals and how they were used.

5. *School resources* - principals gave an indication of factors which may have hindered student learning at their schools including lack of resources, the quality of the teaching staff and the students themselves. The principals' perceptions of the level of autonomy they possessed and the process of induction of new teachers were also the focus of some questions in this section.

Teacher questionnaire

1. *Teacher background information* - including age, gender, qualifications, experience as a teacher and an estimation of the number of hours of work they do in a week in different areas of teaching.

2. *Professional development* - including level of participation, school support and impact on teaching.

3. *Teacher appraisal and feedback* - including frequency of appraisal, who conducts the appraisal, its aims and impact on working conditions and teaching.

4. *Teaching practices, beliefs and attitudes* - teachers were asked about their personal philosophy, their role in teaching at the school and their level of satisfaction. They were also asked about the leadership style of the principal,

5. *Teaching a particular class at the school* - teachers were asked to focus on one particular class and describe the subject, the student characteristics and the methods that they employ. They were also asked to give an estimate of the time spent on administration, keeping order and actual teaching.