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Université Laval's competence-based approach to identifying sustainable development courses and programs

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| Acronyms

CCOFDD - Comité-Conseil sur l'Offre de Formation en Développement Durable (Advisory Committee on Sustainability Education)

ESD - Education for Sustainable Development

HEI - Higher Education Institution

IHQEDS - Institut Hydro Québec en Environnement, Développement et Société (Hydro Quebec Insitute for Environment, Development and Society)

KCS - Key Competencies in Sustainability

SD - Sustainable Development

STARS - AASHE: Sustainability Tracking and Ranking System from the American Association for Sustainability in Higher Education

UL - Université Laval

| Executive Summary

It is increasingly important for Higher Education Institutions (HEIs) to integrate sustainable development (SD) themes into courses and program curricula. Given their benefits for operational success (Kerzner, 2011), assessment and reporting tools have thus been applied to the identification and tracking of Education for Sustainable Development (ESD) content in HEI courses and programs (Sayed & Asmuss, 2013).

Most participating HEIs utilize a knowledge-based approach to identify SD-related courses and programs. Using this approach, they create a list of "SD-related topics" and then scan academic offerings for the presence of these topics. However, such an approach encourages an insertion of SD topics amongst existing academic curricula, as opposed to holistically integrating them across programs and courses (Figueiró & Raufflet, 2015). Thus, a knowledge-based approach to identifying SD-related courses and programs has serious drawbacks.

Furthermore, this indicator choice creates a gap between popular ESD measurement indicators and the desired approach to ESD suggested in the literature. In fact, much of the literature advocates for an approach to ESD based on Key Competencies for Sustainability (KCS). This refers to developing a student's network of skills and knowledge necessary to

adequately confront complex SD issues (Wiek, Withycombe, & Redman, 2011), as opposed to simply transmitting the current state of knowledge. Namely Wiek et al. identify five KCS: systems thinking, anticipatory, normative, strategic, and interpersonal.

In an attempt to bridge this gap between ESD indicators and the ESD literature on KCS, since 2012 Université Laval's (UL) *Advisory Committee on Sustainability Education* [1] has researched, discussed and developed an SD course and program assessment and reporting framework based on these KCS. This is accomplished using a questionnaire-based method allowing faculty members to self-evaluate their courses and establish an SD designation. These evaluations can then be grouped to identify SD programs based on the degree to which students develop the KCS throughout their studies.

To date, this method has been used to identify 377 SD courses and 6 SD programs. While they still have improvements to make in terms of data gathering and encouraging faculty participation, UL offers a unique approach to HEI ESD assessment and reporting. This report therefore aims to contextualize, describe and discuss UL's method, and to establish its comparative benefits and challenges as an alternative to the more typical approaches.

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[1] *Comité-Conseil sur l'Offre de Formation en Développement Durable* in French (CCOFDD)

Academic supervision from Olivier Boiral | By Kendra Pomerantz

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| Introduction

This report is put forth in the context of the massive problems facing modern society. Be it climate change, extreme poverty and inequality, economic instability, or resource overexploitation, it is increasingly clear that action is necessary to overcome these global challenges. Higher Education Institutions (HEIs) can help form future leaders to face these problems through Education for Sustainable Development (ESD). To ensure that academic curricula are adequately supporting this goal, many HEIs use ESD assessment and reporting frameworks to identify and promote sustainable develop-ment (SD)-related courses and programs.

Most universities use a 'knowledge based' approach to SD course and program identification, identifying the presence of cer-tain designated SD topics in the course mate-rial. However, Université Laval (UL) has developed an alternative approach, more aligned with operationalizing the literature on Key Competencies for Sustainability (KCS). This term refers to the development of the knowledge and skills necessary to face com-plex SD-related issues. As such, their identification framework aims to measure to what degree these competencies are being developed in students through their courses and programs.

This report aims to describe and analyze this alternative framework in the context of the current literature on SD education and identification methods, ascertaining its strengths, weaknesses and contribution to advancing SD course and program identifica-tion in HEIs. To this end, following this introduction, a review of the literature and methodology, this report consists of two main sections.

The first is a case study of UL outlining the history of SD-curricula identification and re-porting, the resulting operationalized method, and the results to date. Due to the uniqueness of UL's approach, this section aims to provide a detailed description to help others under-stand the KCS-based method, and provide insights for other HEIs considering similar programs.

The second section aims to bring together the literature review and UL case study, to outline the strengths and weaknesses of UL's method, and suggest future directions for improve-ment and research. Finally, the conclusion dentifies UL's overall contribution to advanc-ing the academic discussion on ESD measure-ment and reporting, and provides future avenues for research and expansion.

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| Literature Review and Research Topic

Assessment and Reporting for the promotion of Education for Sustainable Development in Higher Education Institutions

Since the publication of the influential *Brundtland Report* in 1987, the topic of SD has been a major societal preoccupation in the face of numerous environmental and social issues. HEIs play an important role in contributing to their resolution (e.g. Lozano, 2006a; Mcmillin & Dyball, 2009; Stough, Ceulemans, Lambrechts, & Cappuyns, 2017), by equipping future leaders with the necessary skills and knowledge to face SD challenges (e.g. (Cortese, 2003; Lozano, 2006a) and by shaping the direction of knowledge creation and dissemination (Luks & Siebenhüner, 2007; Stough, Ceulemans, Lambrechts, & Cappuyns, 2017). Education for Sustainable Development (ESD) is therefore increasingly discussed in the literature on HEI sustainability (Wals, 2014).

Business theories have long recognized the importance of adequate measurement, accounting and reporting of relevant criteria (or "indicators") as tools to facilitate operational improvement (Kerzner, 2011). Thus, to help advance these ESD objectives (as well as other SD-related initiatives in HEIs), multiple HEI SD measurement frameworks have been developed. These are voluntarily employed by hundreds of HEIs, using measurable indicators to benchmark a given campus' "degree of sustainability" (Sayed & Asmuss, 2013). For most of these measurement frameworks, academic proliferation of SD is established through the percentage of courses and programs that have SD-related content, and how many students are enrolled in them (Lozano, 2006b). This approach provides a global view of SD integration across various faculties and can identify areas in which a more concerted effort is necessary (Stough et al., 2017), as well as help interested students identify and integrate ESD into their studies (AASHE, 2017c).

However, while these perspectives highlight the importance of a cross-campus SD course audit, there has been little discussion of exactly what indicators auditors should be assessing when establishing whether a given course or program can be considered "ESD" or not. For example, a 2016 study of the most popular HEI SD rating frameworks found a huge range of criteria, both from an education and operations perspective (Bullock & Wilder, 2016). These differences have serious effects on the verdicts of the assessments. Given the central importance of selecting and measuring the correct indicators, an unavoidable question must be posed: *What, exactly, constitutes as an SD course or program?* It is important that a standardized answer to this question be established, because subjective indicator selection and interpretation remains a barrier to the widespread proliferation of HEI SD measurement systems (Shi & Lai, 2013), and thus a serious impediment to SD progress.

Flawed Knowledge-Based Indicator Selection for Measuring ESD

For many HEIs, the most apparent identification of SD-related course and program content is one based on knowledge transmission (Lambrechts, Mulà, Ceulemans, Molderez, & Gaeremynck, 2013; McMillin & Dyball, 2009). SD is broken down into various sub-topics, and then courses or programs are analyzed for the presence of one of these topics, often using a keyword search or manual study of course descriptions. While the centralization of this method offers logistical benefits, some researchers have pointed out serious pitfalls. For one thing, reducing SD to its constituent sub-topics treats it as "just another course or research project as expendable as anything else" (Wals, 2014). Furthermore, in the efforts to consolidate SD's "highly complex challenges that include multiple problem dimensions" (Luks & Siebenhüner, 2007) with the disciplinary nature of HEI courses, knowledge-based indicators are consistent with an "SD insertion" approach (Figueiró & Raufflet, 2015). For example, a stand-alone unit on

sustainability may be added to an existing course, or a stand-alone sustainability course may be added to an existing program, without changing the rest of the material. However, the literature argues that HEIs should be encouraged to integrate SD into curriculum rather than insert it (Figueiró & Raufflet, 2015). This refers to the implicit addition of SD principles in a transdisciplinary manner throughout all programs.

Furthermore, from a standardization perspective, a comprehensive list of all SD-related topics across all disciplines is impossible to compile (Richard et al., 2017), especially one that spanned multiple institutions and rapidly advancing fields. This would make a uniform knowledge-based set of indicators unattainable. Finally, given the complexity of current SD-related issues, it is impossible to know exactly what problems will arise in the future. While understanding the current state of knowledge about SD issues is important, focusing exclusively on this knowledge, which may soon become obsolete or incomplete, can be considered insufficient to properly prepare students to engage with these issues throughout their lives (Thomas, 2009). Thus, knowledge-based indicators for ESD measurement have some serious downfalls.
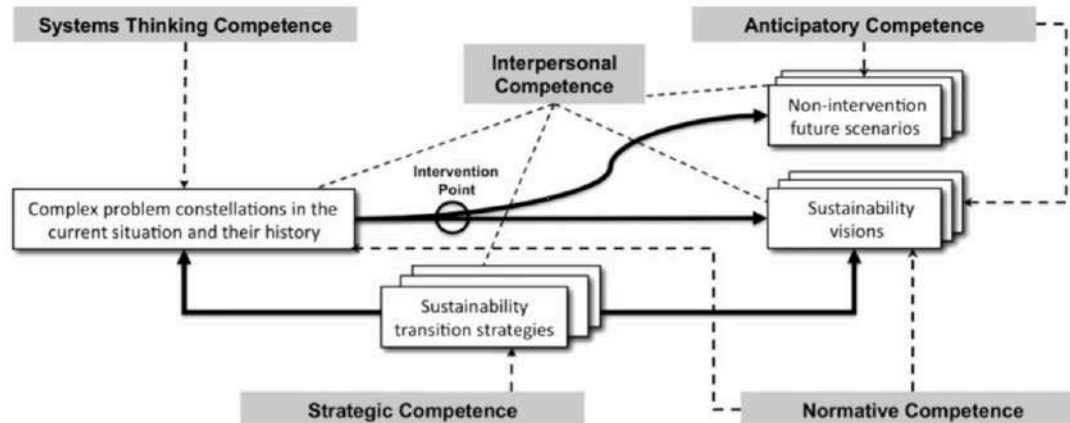
The Competency-Based Approach to ESD

In fact, a knowledge-based approach to ESD assessment and reporting represents a gap between what is being measured, and what the literature on ESD advocates is important. Indeed, many managers know that 'what gets measured gets done" (Shriberg, 2002), and yet literature suggests that these ESD indicators are simply measuring the wrong criteria.

Instead, much of the literature advocates for a competency-based approach to ESD (eg: (Lambrechts, 2015; Richard et al., 2017; Thomas, 2009; Wiek et al., 2011). This approach focuses on the comprehensive development of students' "key competencies in sustainability" (KCS), a term referring to "complexes of knowledge, skills, and attitudes that enable successful task performance and problem solving with respect to real-world sustainability problems, challenges, and opportunities" (Wiek et al., 2011). In 2011, Wiek et al. published an exhaustive literature review, creating a framework of five primary KCS (Figure 1). These are as follows:

1. Systems thinking competence: The ability to conceptualize interactions between various components, and comprehend complex systems. These systems could span various disciplines, time- and geographic scales, and societal groups.

2. Anticipatory competence: The ability to envision cause and effect scenarios and foresee the potential consequences of various courses of action (or inaction).

3. Normative competence: The ability to integrate value-based judgements into decision-making and adjust outcomes based on rules, ethics or norms.

4. Strategic competence: The ability to create and operationalize plans and solutions to complex problems. Put simply, the ability to "get things done" (Wiek et al., 2011).

5. Interpersonal competence: The ability to work collaboratively, and initiate discussions and exchanges to engage multiple stakeholders.

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FIGURE 1: INTEGRATED SUSTAINABILITY RESEARCH AND PROBLEM-SOLVING FRAMEWORK.

SOURCE: WIEK ET AL., 2011, PG 206

Thus, this KCS-based approach is promoted as being optimal to integrate ESD. However, ESD assessment and reporting frameworks still largely base themselves on a knowledge-based approach. ESD researchers, therefore, have little information regarding the degree to which the development of these KCS is actually happening in the lecture hall (Lambrechts et al., 2013).

Research Topic

Thus, a disparity exists between the ESD indicators measured by many HEIs and the optimal approach to ESD advocated in the literature. However, Université Laval (UL) has attempted to close this gap by developing a system of ESD indicators based on the 5 KCS framework developed by Wiek et al (2011).

This report thus has two objectives:

1. To describe the history and resulting method at UL in the form of a descriptive case study

2. To discuss this method and outline its strengths and weaknesses, thus suggesting future directions for improvement and further research.

| **Methodology**

Three main sources of data were consulted for this report. First, internal UL documents were utilized to reconstruct the evolution of the course- and program-evaluation method, and to adequately understand and describe its inner-workings. More specifically, over one hundred documents on the CCOFDD's internal server were read and analyzed. This included, most notably, annual internal activity reports, the minutes from all meetings dating back to 2012, the internal course-and program- database and training documentation. Second, many relevant stakeholders were also consulted through interviews and email correspondence. This included members of the *ad hoc committee,* who were able to discuss the barriers that they faced and the UL community's reaction; academics, who were able to comment on UL's resulting approach; and other relevant stakeholders. Finally, the numerous comments submitted by faculty members through the CCOFDD's assessment questionnaire were analyzed to obtain the perspective of participating professors. It is important that these diverse perspectives continue to provide input as the CCOFDD's work evolves.

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| Description of UL's Method

Between 2009 and 2017, Université Laval (UL) pioneered an ESD identification and measurement framework based on the KCS. The institution then applied this framework, allowing it to measure, rank and categorize courses and programs based on the degree of integration of SD and the development of these KCS throughout the curriculum. This section will describe this approach, whereas Section 5 will provide a more critical discussion of the method's advantages and disadvantages, as well as some recommendations for improvement.

The need for an ESD measurement system

Following the publication of Université Laval's first SD policy in 2008, an article was added to the *Undergraduate Academic Regulations* (currently Article 104c) stating that all undergraduate programs now had to include at least one mandatory course in SD, or demonstrate that SD-related material was adequately covered through other means (Université Laval, 2017b). The course DDU-1000, Fundamentals of SD, was created in light of this rule, but UL was also aware that many existing courses could be identified to also fulfill the requirement. However, this necessitated an understanding of what constituted as an "SD course," and a means of assessing to which courses it would apply.

Furthermore, from an external perspective, UL wished to communicate their SD practices and participate in an external certification process to recognize their campus. The *Association for the Advancement of Sustainability in Higher Education's (AASHE)* ranking system was selected, the *Sustainability Tracking, Assessment and Ranking System (STARS).* As one of several parts of this assessment, the university would have to provide a complete list of all SD courses and programs offered across their campus (CCOFDD, 2012).

To fulfill these objectives, a framework to identify SD-related courses and programs was therefore necessary.

Initial SD Course List

After reviewing the course identification strategies utilized at other HEIs, an initial attempt was made to create this SD course list in the fall of 2011. This list was generated based on (1) previous work undertaken by the IHQEDS, (2) courses suggested by departmental members, (3) a keyword search through course titles, and (4) a manual course description assessment.

However, UL was unsatisfied with the resulting list of courses. First, there was a lack of coherence between chosen courses, as each contributor appeared to have unique definitions of SD without cross-institutional standardization of what was being measured. Furthermore, much of the identification was undertaken by a single administrator, mainly through the keyword search and assessment of the course description. Despite a rigorous approach, an individual could clearly never obtain direct experience with the over 6000 courses and their content, which presented a barrier to centrally ascertaining the presence of ESD content. An approach more tailored to the multidisciplinary and multi-faculty context of the university was deemed necessary.

Implementation of an institutional ESD governance structure

In order to solve these problems, a committee was created in 2012 by the Vice Rectorate, Academic and International Activities and the Vice Rectorate, Executive Development. The

committee is known as the Advisory Committee on Sustainability Education (CCOFDD),[2] and was given the mandate to create a database of SD-related courses and programs, valorize and promote these initiatives, and help faculties develop more ESD-related content (CCOFDD, 2012).

The CCOFDD includes all stakeholders involved in ESD to promote it in a participatory manner (Appendix 1). With nearly 30 members, it is chaired by the *Undergraduate General Direction* (DGPC) and *Faculty of Graduate and Post-Doctoral Studies* (FESP), and includes a representative from:

- each of the university's academic faculties,
- the two major student associations,
- the Hydro Quebec Institute for Environment, Development and Society
- the Institute for Advanced International Studies,
- the office of the Vice-Rectorate, Executive Development.

Due to its size, it was decided that the CCOFDD would only meet twice a year, but an *ad hoc* committee was quickly established to carry out the more granular research and planning tasks and report back to the entire committee (Richard et al., 2017).

Before an ESD identification strategy could be created, it was important for the CCOFDD to establish the theoretical basis underpinning its activities. They quickly realized that a SD definition, based on the "three poles of sustainability," – environment, society and economics – would correspond only to a knowledge-based approach to SD course identification and could prove reductionist and difficult to apply, given the diversity of disciplines taught at UL (CCOFDD, 2013). The CCOFDD therefore combined this Brundtland Report's definition of SD (1987) ("development that meets the needs of the present without compromising the ability of future generations to meet their own needs.") with Quebec's *Sustainable Development Act (Ministre du Développement durable, 2006),* which articulates 16 principles to be integrated into SD initiatives (Appendix 2). These conceptualizations formed the working SD definition on which the CCOFDD's actions were based.

Next, the committee wished to establish the methods upon which to base their forthcoming ESD identification system which favoured interdisciplinarity and integration of multiple perspectives (CCOFDD, 2013). Following a review of the literature by the *ad hoc* committee, it was decided that Wiek et al.'s five KCS would form the theoretical basis for their work. In addition to the research forming an ideal foundation for indicator selection (see Section 2), Dr. Wiek possesses a concrete understanding and expertise as well as numerous publications on the topics of competencies and pedagogy in sustainability education. Indeed, the 2011 literature review on KCS has since been cited hundreds of times and has inspired much of the subsequent research in the field. As such, his analysis on the 5 KCS was deemed a suitable and rigorous theoretical framework for the CCOFDD's work.

Finally, the CCOFDD decided to use a *curricular approach* to program analysis. In a *program-based* approach, the program is viewed as the sum of the individual courses a student must complete. However, a curricular approach considers not only the content of these courses, but also the coherence, continuity and progression of that content between courses and throughout

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[2] *Comité-Conseil sur l'Offre de Formation en Développement Durable* in French, or CCOFDD

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the student's trajectory through the program. Therefore, programs' overarching objectives, which underpin all its learning activities, must be considered as a framework to provide a holistic and contextual view of what would otherwise be simply a disconnected list of courses. (CCOFDD, 2013)

UL's method of SD Course Identification

With this theoretical framework in place, the CCOFDD could now create a concrete method of identifying SD courses at UL. Based on the KCS literature, it was decided that such a system would measure the degree to which a given course integrated SD concepts to develop one or several of the KCS. At this individual course level, it was also decided that only the first four KCS (systems thinking, anticipatory, normative and strategic competencies) would be included, with the interpersonal competence omitted. The university's academic regulations specified that, at a program level, many of the competencies inherent to Wiek et *al.*'s interpersonal competence were already required to be developed throughout the curriculum (Université Laval, 2017b). Therefore, this fifth key competence was integrated only during the program-level SD assessment, as opposed to the more granular course level (CCOFDD, 2016b).

In order to operationalize the ESD academic literature, a practical definition was created for each of the competencies that included indicators to recognize its presence in curriculum (Appendix 3). However, one of the first major challenges faced by the CCOFDD was the difficulty in determining where the development of these competencies was present. Without a nuanced understanding of every discipline and course's content, it was impossible for a central body to assess courses for these features in an informed and standardized manner. For these reasons, it was decided that a centralized committee-based assessment should not be pursued. Instead, the professors would self-assess their courses and, ultimately, be the ones to identify SD courses as per the CCOFDD's guiding framework (CCOFDD, 2016b). To this end, a 16-point questionnaire was developed to be completed by professors (Appendix 4). This questionnaire, primarily, collects four categories of responses:

(1) The course code, title and professor

(2) The level to which each of the four key competencies are developed through the course's learning activities, using Likert scale questions

(3) The professor's comments on the process or on their course

(4) The professor's verdict on whether this course should be labelled as:

    (1) An "Awareness" course: Creating an initial awareness of SD
    (2) An "Introductory" course: Providing a preliminary study of SD
    (3) An "Advanced" course: Critically analyzing SD
    (4) Not an SD course

As the next section will explain, the Likert scale-based questions primarily contribute to program analysis, but also help guide the professor through the reflection process to understand the KCS approach and assess the status of their course. Furthermore, the comment section allows the CCOFDD to collect feedback to improve the process.

The responses to these questionnaires are continuously compiled into a database. The courses categorized as "Awareness," "Introductory" or "Advanced" are flagged as "SD" courses and publicized as such. In order to communicate these results, SD courses appear on an online list, and an "SD" label is added beside them on all online course selection menus.

UL's method of SD Program Identification

Once 75 % of the courses in a program have been analyzed using the questionnaire (or 100 % of the courses in a micro-program), it becomes possible to conduct a program-wide analysis. Whereas on a course-based level, the professor's ultimate verdict is what dictates whether an SD label is awarded or not, the program-wide analysis utilizes a more holistic and competence-based approach. This is based on the assumption that even courses which do not have directly SD-related content can contribute to the development of the KCS.

In order to begin the program analysis procedure, the CCOFDD must first produce a summary table, which compiles the questionnaire answers for the program's courses to obtain overall development levels for each of the first four key competencies. For the summary to be representative of the average student enrolled in the program, courses must be weighted based on the expected probability that given a student will enroll in them[3].

Once courses have been weighted, a cumulative table is developed for the program to calculate what weighted percentage of its courses develop each key competence "Completely," "Mostly," or "A Little." For a program to be considered "SD based," the targets and thresholds outlined in Figure 2 must be reached.

FIGURE 2: THRESHOLDS AND TARGETS FOR AN SD-BASED PROGRAM

		Undergraduate degrees	Certificates	Masters and graduate degrees	Micro-programs
Threshold	Weighted average of analyzed courses	75 %	75 %	75 %	100%
Targets	Weighted percentage of credits that **significantly** develop SD key competencies (Completely and Mostly)	30%	30%	30%	60 %
	Weighted percentage of credits that develop SD key competencies (Completely, Mostly and A Little)	60%	60%	60%	100 %

SOURCE: TRANSLATED FROM *GUIDE DE RECONNAISSANCE,* 2016, PG 13

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[3] By way of illustrative example, if a 3-credit course that develops the normative competence is on a list of three courses from which each student can only chose one, it can be assumed that there is a 33% chance that this course will have been taken by a given graduating student, and so it contributes "1 credit's worth" of normative competence development to the overall program assessment. A similar weighting process can be applied to all the courses in the program, and amended based on the statistical probability that a student will enroll. (CCOFDD, n.d.)

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If all thresholds and targets have been met, or nearly met, the program direction committee (a director, three students and three professors) can begin the process of examining the program with the CCOFDD to reach a conclusion regarding its status. For this, they use the SD Program Recognition Form (Appendix 5) to lead them through a reflection and produce a report describing the program's focus on SD, and providing reasoning for any inconsistency (such as a target or threshold not quite having been attained). Another important aspect of the program assessment process is the reintegration of the interpersonal key competence. By holistically assessing the program, the program committee must justify how this competence is developed and include this description in the SD Program report. Once all this program data has been collected, the program report is assessed by the CCOFDD to ensure that all competencies are developed and integrated throughout the program. If the key competences are deemed to be present to an adequate degree, the program is considered "SD focused," and listed online and in the CCOFDD's documentation.

Operationalization and results

The CCOFDD's course identification method was launched in fall 2013 with an email to all UL professors (Université Laval, 2017a). The program-level analysis was then developed throughout the summer of 2014, using preliminary "un-official" evaluations filled out by doctoral students to populate the database and develop the analysis tools. Finally, also in the summer of 2014, the CCOFDD organized formal interviews with five key UL faculties to collect some initial feedback on their newly developed program evaluation tool.

The system has been rolled out gradually since that time. Over the following three years, the CCOFDD continued to meet regularly to develop these tools and promote them amongst academic staff members, as well as create the supporting documentation and guides. As of summer 2017, 689 course questionnaires have been submitted awarding 377 "SD course" titles.[4] The breakdown of these courses by verdict is illustrated in Figure 3.

FIGURE 3 : DISTRIBUTION OF ANALYZED COURSES (AS OF SUMMER, 2017)
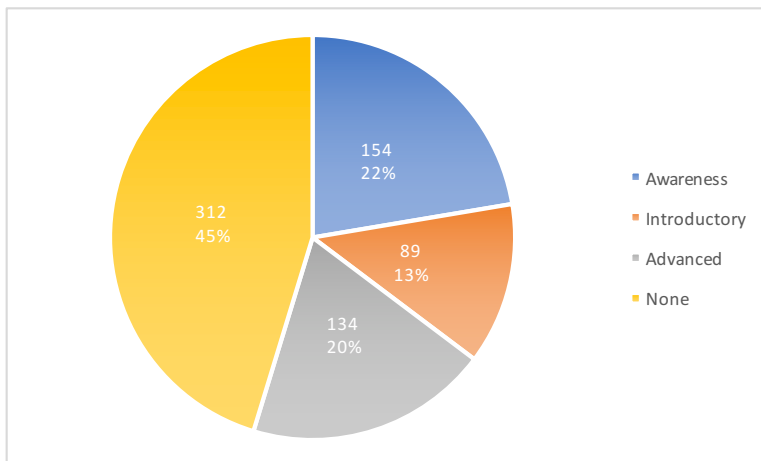
SOURCE : CCOFDD, 2017, PG. 6

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[4] Note that this number may differ from the number of SD courses listed online, as the course offerings are modified on a semesterly basis.

Furthermore, with the larger volume of analyzed courses, the CCOFDD has been able to conduct summary analyses for 24 programs. Of these, 6 were deemed to be SD focused, with ten more in various stages of certification (CCOFDD, 2016a). Namely, these programs are :

- Certificate in sustainable development

- Integrated Baccalaureat in Natural and Managed Environments

- Masters in Business Administration (MBA) in organizational social and environmental responsibility

- Masters of Planning and Regional Development

- Microprogram in Environmental Education and Sustainable Development

- Microprogram in Business Administration, organizational social and environmental responsibility

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| Discussion

Operationalization of the KCS-Based Approach: The Framework

The KCS-based method accounts for more than just knowledge acquisition, which has been shown to be insufficient to incite behavior change (Hines, Hungerford, & Tomera, 1987). However, there have been critiques raised with regards to the method with which this information is collected.

UTILIZATION OF THE KCS-BASED METHOD: First, there are potential flaws in the KCS-based indicator choice. While the KCS-based approach is increasingly supported in the literature, there still exist some critical perspectives regarding standardization issues which must be addressed. Namely, some researchers advocate that any 'one size fits all' approach to SD is unrealistic. Individually, students have different attitudes towards SD (Kals & Maes, 2002; Tzschentke, Kirk, & Lynch, 2008), as well as different degrees of consciousness (or "psychological maturity") affecting their ability to understand and assimilate multiple perspectives when approaching complex SD issues (Bartunek, Gordon, & Weathersby, 1983; Boiral, Baron, & Gunnlaugson, 2014). In other words, not all people exposed to a given ESD curricula will develop their KCS to the same degree, suggesting that a KCS-based approach ESD is insufficient to predict outcomes for all students. These examples illustrate the problem inherent to prescribing a common set of KCS to many different students. However, similarly to the knowledge-based approach's standardization issues, it would be almost impossible to individually assess the needs of every student and design a custom approach. Thus, a broad and comprehensive framework, such as that of Wiek et al., assures that all basis are covered across the HEI. As such, despite these critiques, this framework offers an improved approach towards ESD.

The CCOFDD's theoretical framework also does not include every important factor. Namely, the interpersonal competence is omitted from course-evaluation questionnaires, and the justification requirements at the program-evaluation stage are rather vague. Wiek et al. demonstrate the importance of this competence, explaining that the "Interpersonal competence is closely linked to all other competencies, as all rely on collaborative approaches to create ownership for the [intermediate] results, to leverage implementation, and to build joint capacity to cope with complex sustainability challenges" (Wiek et al., 2011). As such, its omission creates a theoretical gap in the framework.

POTENTIAL GAP BETWEEN TEACHER INTENTION AND PRACTICE: Furthermore, utilizing a professorial survey to collect information regarding students' abilities and competencies can be seen as inconsistent. It has been shown that a professor's intention in terms of learning outcomes for students will significantly impact the way they teach (Martin et al., 2000). This suggests that the intention of developing a certain competence in their students (especially one expressed outright through the completion of a questionnaire) will lead the professor to adopt teaching styles to maximize these learning outcomes, supporting UL's questionnaire-based method.

However, a faculty member's intention to transmit a certain competence may not always translate into practice, especially if the professor is lacking specific "ESD teaching competencies" (Bertschy, Künzli, & Lehmann, 2013). This potential gap in teaching skill calls into question the information collected through the survey method. Some teachers with less-developed ESD teaching competencies, while potentially having the intention to develop a certain competence in their students, may be unable to achieve this goal in practice. However, the current questionnaire method assumes that the intention to develop KCS is akin to the ability to do so.

Recommendations: KCS-Based Framework

First, the interpersonal competence should be integrated directly into both the course- and program- evaluations. Factors such as group projects, participatory class discussions, or collaborative immersive learning activities could function as proxies for the development of this competence. Already, several stakeholder comments have observed the absence of the interpersonal competence in the course evaluation, and these comments are being considered by the CCOFDD for future versions of the questionnaire.

Furthermore, considering that the program evaluation framework is directly based on the assumption that these KCS are being developed, further testing of student KCS should be required to support the data collected via questionnaires. For example, exams could be developed to assess a student's ability to apply the various KCS (systems, anticipatory, normative and strategic thinking), given to the same sample of students at the beginning and end of a program. These results could be used to corroborate questionnaire data and aid in the assignment of an SD program designation.

The Questionnaire-Based Method: Quality of Information

In addition to the theoretical approach based in KCS, UL's method differs from many others in its operational approach. Rather than centralizing course assessment (such as through an approach carried out completely by an Office of Sustainability), UL course information is completely gathered through the submission of faculty-completed questionnaires assessing their own course.

FACULTY PARTICIPATION: With the questionnaire method, the number of ESD courses will be dependent on how many faculty members have chosen to participate in the survey. Given that a 100% participation rate is essentially not possible with such a method, there are likely numerous courses which could be considered ESD but which are excluded because no questionnaire has been submitted.

This assessment bears out in an analysis of UL's results to date. Whereas a centralized method assesses all courses and programs, to date only 12.8% of UL's courses have had a corresponding questionnaire submitted[5]. This means that any ESD descriptive statistics exclude over 87% of offered courses, which drastically affects their credibility. Most notably, as illustrated in Figure 3, to date 55% of course questionnaires have designated the course in question as SD. While an ESD-proponent may find such a result desirable, it is extremely unlikely that these numbers are representative of UL's entire course offering. For example, a "perfect" STARS score for ESD courses is awarded when 20% of an HEI's courses have SD-related content (AASHE, 2017c), suggesting that even that level is difficult to achieve without considerable effort. Against this benchmark, one can be fairly certain that UL professors who know their course is likely to be designated as SD are more likely to submit the questionnaire, explaining why the majority of questionnaires conclude with a positive verdict. As such, because of low participation, especially with regards to non-SD-related courses, the CCOFDD's results cannot be extrapolated across all UL courses, decreasing their utility in depicting the current situation.

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[5] This calculation is based on the 689 questionnaires submitted as of Summer 2017 as a percentage of the 5389 undergraduate and graduate courses offered at the university (AASHE, 2016).

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Similarly, a study in the spring of 2017 also found that six programs at UL had the KCS development necessary to be certified in SD, but the program directors had simply not submitted the required forms (CCOFDD, 2017a). This state of affairs highlights a problem with communication of the new framework to ensure participation. Given that the program verification framework has only been in place since the end of 2015, this could improve with time.

FACULTY SENSITIZATION: However, it is worth noting that the participation of these faculty members, as well as the numerous interviews and requests for feedback throughout the CCOFDD's process, helps to educate members of the UL community. In fact, simply getting professors to deeply consider these questions and issues can have a positive effect on the proliferation of ESD (Wright & Wilton, 2012). Indeed, professors have mentioned in questionnaire responses that they now "foresee integrating more SD topics in the future." (CCOFDD, 2017b)

This effect could partially counter-balance the low participation rates created by the questionnaire method, by increasing SD course content amongst those who do chose to partake in the questionnaire submission. However, at UL's current levels of participation this is unlikely to be pronounced enough.

QUALITY OF INFORMATION: By collecting data through questionnaires completed by faculty members, the CCOFDD's method avoids the issues posed by assigning SD labels from a central body. Namely, it ensures that the SD designations are not assigned haphazardly, but instead that the verdict is decided by the person who understands that course material the best and is therefore the most qualified to decide. This effect is especially pronounced in highly specialized or technical courses which would have been unlikely to be recognized by a centralized body, but were able to receive SD designations because of the questionnaire method (for example, the Faculty of Medicine's MED-1222 Hematopoietic System: Foundations and Clinical Problems; the Faculty of Agricultural and Food Science's GAE-3001 Drainage; and the Faculty of Social Science's SOC-2120 Sociology of Technological Innovation). The comprehensive nature of UL's resulting course list is obvious when one compares the diversity of UL's SD course list, offering SD courses across over 80 departments, to a more "typical" list which is much more limited (often focusing on completely sustainability-themed courses, or those in geography, environmental science or other directly related disciplines).

INCONSISTENCIES: However, while an expert in their course, the person filling out the questionnaire may not be an expert in SD principles. As such, UL's method is also prone to serious inconsistencies. Namely, no consistency is necessary between the competence-based assessment questions and the professor's ultimate verdict about the course. Given this inherent subjectivity in responses, the results can vary widely based on a given professor's understanding of SD, or their desire to gain recognition for the course through an SD label. For example, one professor's comments listed "students may choose an SD-related topic for their seminar project" as the justification for a self-prescribed SD label, despite this being a completely unsuitable reason for an SD designation under the CCOFDD's framework. Another commented "this course takes a transversal perspective. I address ethical decisional processes, their foundations and the institutionalization of ethics in an organization," but then deemed the class "Not an SD course" despite this clear integration of the normative competence (CCOFDD, 2017b). Thus, there is no justification for SD designations and there is no course of action to call these designations into question or request more information.

RECOMMENDATION: QUESTIONNAIRE METHOD

UL could maintain the benefits of the questionnaire method while reducing its disadvantages by continuing to improve the way that it reaches faculty members. Whereas UL currently relies on email campaigns and word of mouth to promote the questionnaire, other HEIs offer alternative approaches. For example, members of the Sustainability Advisory Council at Northern Michigan University attend department meetings at which all departmental faculty members are present and make presentations. Directly following these presentations, all faculty members are asked to fill out the questionnaire on-site (AASHE, 2017a). This method provides two major benefits. First, this method would allow the CCOFDD to reach many faculty members at once, thus improving participation rates. Furthermore, from a consistency perspective, the chance to verbally explain their desired definition of SD and initiate a dialogue could maximize the chances of a more standard understanding of SD across all questionnaire answers. This would further enhance the beneficial effects of a questionnaire method.

The CCOFDD's Structure: Institutionalizing ESD at UL

Whereas many HEIs manage ESD initiatives from a central governing body (often the Office of Sustainability), the CCOFDD approach brings together and empowers stakeholders from every faculty. This approach has concrete advantages compared to a centralized method.

"TOP DOWN MEETS BOTTOM UP": The participation of many members of the UL community makes the CCOFDD's method simultaneously "top down" and "bottom up". Given faculty members' often long careers at the institution, and ability to diffuse ideas through their courses and research, their acceptance of the SD initiative can often be crucial to its continuity (Brinkhurst, Rose, Maurice, & Ackerman, 2011). Despite being an administration-driven initiative, the CCOFDD's method heavily integrates faculty, as well as representatives from departments, staff, and students, and was developed using input from many stakeholders. As such, their approach is "top down meets bottom up," uniting multiple factors central to institutional change management.

HIGH POTENTIAL FOR INSTITUTIONALIZATION: Indeed, from a perennity perspective, perhaps this method's most notable strength is its potential to truly impact institutional culture. The ultimate goal of any innovative idea, such as the many recent initiatives to increase ESD, is for it to become so widespread that it is institutionalized, at which point it becomes permanently integrated into the institution's culture (Lozano, 2006a). However, many innovative visions never truly "diffuse" throughout an organization (Kohles, Bligh, & Carsten, 2013).

Ultimately, one of the deciding factors of the level of innovation diffusion is interpersonal. In short, it can be difficult to convince certain people to adopt new habits (Rogers, 1995). Indeed, competency-based education theory is not prevalent in the Quebec HEI setting, and certain educators can even harbor bias against the term. However, opinion leaders play an important role in overcoming this resistance. These individuals are the champions of the new idea, and usually act as the "link between the innovator and the organization" (Lozano, 2006a).

By meeting centrally with a representative of every faculty (who, theoretically, is already enthusiastic about ESD), the CCOFDD can develop and transmit these new ideas from the central administration to the individual faculties. Then, these "opinion leaders" can return to their faculties and promote ESD activities and ideas. Through the CCCOFDD, UL has thus almost exactly replicated the literature's model for the dissemination of new ideas in the HEI setting

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(Elton, 2003). Due to the high visibility of labelling of SD courses, the initiative can then have a snowball effect, spreading throughout the institution.

The CCOFDD should reflect on how to better leverage the large group of potential opinion leaders on the committee to produce more concrete results in terms of professorial participation and, ultimately, institutionalization of their method. For example, the CCOFDD's foundational documents currently list the following as the expected roles of committee members outside of meetings: "They are (…) requested to submit any relevant information arising from the work of the CCOFDD to their vice-dean or their faculty" (CCOFDD, 2017c). While this expectation does encompass the spirit of using opinion leaders for institutionalization, it lacks measurable or actionable steps that committee members can take to advance these goals. Therefore, the CCOFDD should work to clarify their expectations of members and provide more concrete objectives to advance ESD initiatives in faculties. These could include communication objectives (such as including CCOFDD updates in departmental newsletters or meetings), questionnaire objectives (such as following up individually with professors such that a certain target number of questionnaires are submitted per month), or engagement objectives (such as gaining visibility for their participation in the CCOFDD and becoming more known as an "ESD Champion" in their home faculty). The CCOFDD could thus optimize the potential of their structure to institutionalize ESD at UL. This would not only help increase participation rates, but would also increase engagement across the community and ensure the positive evolution of such initiatives in the future.

Final verdict on the KCS-based approach

It has hereby been demonstrated that there are definite advantages and disadvantages to UL's KCS-based approach to SD course and program assessment and reporting. Current drawbacks to the method include the fact that the questionnaire-based method has been deemed insufficient to truly ascertain whether students have developed KCS, the omission of the interpersonal KCS, the lower participation rates, the inconsistencies in responses, and the potential for professorial resistance.

However, UL's framework's disadvantages are outweighed by its current and potential benefits. Indeed, improvement in the aforementioned areas would reinforce the high faculty sensitization potential, the quality of information given the respondent's intimate knowledge of course content, and the high potential for institutionalization given the diverse members of the university community sitting on the CCOFDD.

Furthermore, unlike the alternative knowledge-based model, the KCS-based approach incorporates knowledge, skills and abilities which can be developed in an integrated way across even courses and programs which do not directly address SD issues, thus providing the potential to infuse a wide variety of curricular offerings. And, ultimately, students need more than just knowledge alone to ensure that the next generation is well equipped to face large global problems.

As such, while there are improvements to make in terms of the operationalization of UL's method, these disadvantages are outweighed by its theoretically superior basis and numerous comparative advantages.

| Conclusion and Future Prospects

This report has aimed to use UL as a case study to advance the discussion on the identification, assessment and reporting of SD-related courses and programs. As demonstrated in the Literature Review (Section 2), assessment and reporting frameworks measuring ESD content in HEIs can help benchmark and improve these initiatives in the context of massive global SD issues. However, most HEIs use a knowledge-based approach to ESD assessment and reporting, consisting of identifying the presence of certain SD-related topics, even though such indicators are inconstant with the approach to ESD recommended in the literature. Indeed, ESD researchers recommend a more holistic integration of SD principles across disciplines. More specifically, this integration should result in the development of KCS, assuring that students possess the skillsets necessary to combat future problems, even as the state of knowledge evolves.

However, Université Laval has attempted to bridge this gap between ESD indicators and literature, by developing an ESD assessment and reporting framework based on the development of the KCS in courses and programs. This report therefore aimed to provide the illustrative example of their resulting method to advance the discussion on ESD assessment and reporting. Section 4 provided a case study of UL's method. Then, Section 5 analyzed its strengths and weaknesses, providing recommendations for future improvement.

It was suggested that the process can be further improved by refining the KCS-measurement technique, increasing the faculty-members' participation, and better leveraging the diverse group of members to increase ESD institutionalization. However, given its numerous concrete and theoretical advantages compared to other alternatives, the

KCS-based approach was deemed an appropriate framework for assessing and reporting on SD-related content in courses and programs.

Overall, while the methods utilized by UL still have flaws, the theoretical basis- that is, the basing of indicators on Wiek et al.'s five KCS- is unique and more conducive to an SD integration approach than alternative methods at other HEIs. Given the expressed interest in UL's approach from the HEI community, it was felt that a detailed analysis would be valuable to raise awareness of this alternative method, and spark the discussion surrounding the relative benefits and disadvantages.

Indeed, in addition to continuing to improve on its SD course- and program-assessment and reporting practices as described above, the CCOFDD has begun to explore other opportunities within UL. These include more proactive ESD integration through the creation of new courses and programs, the idea of applying the SD identification framework to research projects, collaboration with other universities to help disseminate the KCS based approach, as well as collaboration with the job market to assess the importance of these skills to employers of the graduates.

Finally, the CCOFDD has made serious inroads in the promotion of its ESD identification method through its collaboration with the Quebec provincial government's SD Coordination Bureau (*Bureau de Coordination du Développement Durable* in French, or BCDD). As per orientation 2 of the *Government SD Strategy 2015-2020,* the province wishes to promote green sectors and eco-responsible products. Two important indicators identified to this end were the number of graduates from programs supporting the development of SD or green-sector-related competencies, as well as the number of these graduates who could find employment relating to their program.

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To develop a methodology and benchmark these criteria, the BCDD created a participative committee with all Quebecois universities. Given their prior advancements in ESD assessment and reporting, UL was able to largely lead this endeavour in summer 2016, creating a "simplified but not simplistic" version of the KCS-based framework to be applied in all HEIs across the province.

All of these factors contribute to improving the course assessment framework, and advancing the institutional mission of promoting ESD, and producing graduates who are well equipped to resolve the complex problems facing society. The CCOFDD, now well into its seventh year, hopes to continue to maximize its contribution to that important cause.

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| Appendix

Appendix 1: Members of the CCOFDD (2017)

Department	Name	Title
AELIES	à confirmer	Secrétaire générale
CADEUL	Samuel Rouette-Fiset	Vice-président aux affaires institutionnelles
Direction générale des programmes de premier cycle	Alain Faucher	Directeur général du 1er cycle et coprésident du CCOFDD
Direction générale des programmes de premier cycle	Daniel Forget	Coordonnateur d'opérations
Faculté d'aménagement, d'architecture, d'art et de design	Claudia Déméné	Professeure adjointe
Faculté de droit	Véronique Guèvremont	Vice-doyenne
Faculté de foresterie, de géographie et de géomatique	Étienne Berthold	Professeur adjoint
Faculté des lettres et des sciences humaines	Henri Assogba	Professeur agrégé
Faculté de médecine	Marie-Claire Bérubé	Agente de recherche et de planification
Faculté de médecine	Claude Côté	Vice-doyen
Faculté de médecine dentaire	Sylvie Morin	Professeure contractuelle
Faculté de musique	Janis Steprans	Professeur agrégé
Faculté de pharmacie	Daniel Kirouac	Adjoint à la direction facultaire, affaires professionnelles
Faculté de philosophie	Louis-Etienne Pigeon	Chargé d'enseignement
Faculté des études supérieures et postdoctorales	Koassi d'Almeida	Agent de recherche et de planification
Faculté des études supérieures et postdoctorales	Josée Bastien	Doyenne et coprésidente du CCOFDD
Faculté des sciences de	Catherine-Ann	Agente de recherche et de planification

Department	Name	Title
l'administration	Blackburn	
Faculté des sciences de l'agriculture et de l'alimentation	Pierre-Mathieu Charest	Vice-doyen
Faculté des sciences de l'éducation	Barbara Bader	Professeure titulaire
Faculté des sciences et génie	Louis Gosselin	Professeur titulaire
Faculté des sciences infirmières	Clémence Dallaire	Vice- doyenne et Professeure titulaire
Faculté des sciences sociales	Gina Muckle	Vice-doyenne
Faculté de théologie et sciences religieuses	Guy Bonneau	Professeur titulaire
Institut EDS	André Potvin	Directeur
Institut EDS	Liliana Diaz	Responsable de travaux pratiques et de recherche
Institut québécois des hautes études	Paule Halley	Professeure titulaire
Vice-rectorat exécutif et au développement	Pierre Lemay	Adjoint au vice-recteur exécutif et au développement

Appendix 2: Quebec's *Sustainable Development Act,* 16 principles

Source: (Ministre du Développement durable, 2006)

"Health and quality of life"

"Social equity and solidarity"

"Environmental protection"

"Economic efficiency"

"Participation and commitment"

"Access to knowledge"

"Subsidiarity"

"Inter-governmental partnership and cooperation"

"Prevention"

"Precaution"

"Protection of cultural heritage"

"Biodiversity preservation"

"Respect for ecosystem support capacity"

"Responsible production and consumption"

"Polluter pays"

"Internalization of costs"

Appendix 3: Operational definitions of SD key competencies

Source: (Richard et al., 2017)

SYSTEMS-THINKING COMPETENCE

The first key competency assessed in the questionnaire is referred to as systems-thinking competence (Fig. 2). The professor is asked whether one of the aims of the course is to develop the capacity to analyze complex problems in a comprehensive manner, in context, across different disciplines and different scales. Developing this competence leads students to consider the interactions between the structures and systems in society, including values, cultures, conceptions, preferences, needs, institutions and actors. A course that develops systems-thinking competence promotes:

- A deepening of knowledge related to a specific discipline;
- The exploration and mastery of various models, paradigms and points of view;
- Openness to change and difference;
- Recognition of the contribution made by other disciplines when it comes to identifying the issues (interdisciplinary approach);
- A long-term outlook.

ANTICIPATORY COMPETENCE

This key competency corresponds to the capacity to evaluate the consequences of human intervention or non-intervention in future scenarios, based on various qualitative or quantitative data (Fig. 3). By developing this competence, students are enabled to address and reflect on various challenges related to SD based on different scenarios involving intervention or non-intervention by humans within a specific timeframe, that is, (a) on a past-present-future continuum, and (b) over the short, medium or long-term. Developing this competence also entails mastering tools that can be used to project into the future, such as statistical models, simulated scenarios, etc. A course that contributes to the development of anticipatory competence thus focuses on:

- Developing multi-dimensional, creative and innovative ideas or solutions;
- Assessing the relevance of ideas or solutions;
- Considering the principle of prevention and the precautionary principle;
- Prioritizing solutions that respect intergenerational equity;
- Envisioning desirable scenarios for a sustainable future.

NORMATIVE COMPETENCE

The third key competency assessed by the questionnaire relates to the normative aspects of complex problems (Fig. 4). This competency is demonstrated by the capacity to explicitly include the various normative factors that help guide decision-making in the analyses and discussion. This includes legal and ethical aspects, such as values, rules, consequences, laws, etc. In short, the development of this competence enables students to identify and adapt proposed solutions to problems in accordance with the values, rules and other norms inherent in the systems in place, mobilizing the concepts of justice, equity and systems integrity to solve problems within a perspective of SD. A course that contributes to the development of normative competence promotes:

- A human-centred focus with an emphasis on human rights and social obligations;

- Analysis that takes into account the principles of social and environmental justice and intergenerational equity;
- A focus on bringing out the values at stake;
- The notion of personal and collective responsibility.

STRATEGIC COMPETENCE

The last key competency assessed by the questionnaire is strategic competence (Fig. 5). This competence is related to the methodological aspects of any problem solving process from an SD point of view. It refers to the ability to propose inclusive and applicable solutions to complex problems, an essential skill for effective problem solving. It involves using various types of analysis (e.g. qualitative, quantitative or contextual analysis) and the capacity to compare and critically assess different points of view on a subject in order to come up with solutions that are viable in different disciplines, with a view to collective problem-solving in complex situations. Moreover, the capacity to implement an intervention strategy in response to a complex problem is contingent on the ability to organize and mobilize resources such as knowledge, techniques, and analytical and assessment tools, as well as different stakeholders. Ultimately, it is a question of helping students develop the capacity to propose innovative solutions, think outside the box and overcome constraints so as to reframe solutions more effectively. A course that develops this competence focuses on building:

- Project management skills;
- The facility to develop innovative solutions, open up new avenues and implement new ways of doing things;
- The ability to identify the main levers, key actors, and significant partners that will support the process of organizational transformation;
- The capacity to put in place policies and action plans to support and guide various methods of problem-solving);
- The ability to identify performance indicators for measuring change (accountability).

Appendix 4: Recognition of a course in Sustainable Development-Questionnaire

Source: (Richard et al., 2017)

IDENTIFICATION

Duration of the questionnaire: 15 minutes

This questionnaire aims to determine whether the course in question is consistent with a particular approach to sustainability education.

The conception of sustainable development (SD) retained here is based on the vision of SD that Université Laval ascribes to, as well as on the 16 principles set out in Quebec's Sustainable Development Act.

1. Course identification code or name.
2. Institutional email address of the professor in charge of this course.

For additional information, please click on the hyperlinks contained in the questionnaire. You can also download a brochure summarizing all this information by clicking here.

Please note that it will not be possible to save the questionnaire as you go along.

To help you fill out this questionnaire, we suggest that you to refer to your course outline. Don't forget to click on "Send" when the questionnaire has been completed

SYSTEMS-THINKING COMPETENCE

To what extent does this course aim to enable students to:

3. Analyze the structures, dynamics or issues underlying the challenges of SD?
    - Entirely
    - To a large extent
    - A little
    - Not at all
4. Problematize complex situations related to the challenges of SD?
    - Entirely
    - To a large extent
    - A little
    - Not at all
5. Analyze the interactions between various perspectives (points of view, scales or disciplines) regarding the challenges of SD?
    - Entirely
    - To a large extent
    - A little
    - Not at all

ANTICIPATORY COMPETENCE

To what extent does this course aim to enable students to:

6. Analyze the possible consequences of human action and consider the concept of responsibility, within an SD perspective?
   - Entirely
   - To a large extent
   - A little
   - Not at all
7. Consider the principle of prevention and the precautionary principle within an SD perspective?
   - Entirely
   - To a large extent
   - A little
   - Not at all
8. Consider the concept of intergenerational equity within an SD perspective?
   - Entirely
   - To a large extent
   - A little
   - Not at all
9. Devise and analyze various scenarios within an SD perspective?
   - Entirely
   - To a large extent
   - A little
   - Not at all

NORMATIVE COMPETENCE

To what extent does this course aim to enable students to :

10. Analyze the legal or ethical aspects of the challenges of SD?
    - Entirely
    - To a large extent
    - A little
    - Not at all
11. Address the diverse values or principles underlying the challenges of SD?
    - Entirely
    - To a large extent
    - A little
    - Not at all

STRATEGIC COMPETENCE

To what extent does this course aim to enable students to :

12. Develop the capacity to solve complex problems underlying the challenges of SD?
    - Entirely
    - To a large extent
    - A little
    - Not at all
13. Develop the capacity to analyze administrative, political and governance-related constraints in order to guide interventions within an SD perspective?
    - Entirely
    - To a large extent

- A little
- Not at all

14. Develop and implement policies, action plans, programs or management systems within an SD perspective?
    - Entirely
    - To a large extent
    - A little
    - Not at all

CONCLUSION

15. Does this course address any elements pertaining to sustainable development that are not set out explicitly in the course outline? If so, in what way? Does this course address any other aspects of sustainable development? If so, which one(s)? Do you have any other comments?
16. Considering all your answers to the questionnaire, would you say that this course is:
    - An awareness-raising course in SD
    - An introductory course in SD
    - An in-depth course in SD
    - None of the above

Appendix 5: SD Program analysis form

Source: Translated from (CCOFDD, 2016a)

Programs wishing to obtain Sustainable Development (SD) recognition are invited to prepare a brief document (maximum 4 pages) containing notably:

1) Comments, additions or modifications to the program, relative to the course analysis summary tables
2) The program committee responses to the 5 following questions:

    1. What is the link between SD and the general objectives of your program?
    2. How does your program permit the acquisition of the 5th SD key competence, the interpersonal competence, in the framework of your learning activities?
    3. What learning activities do you offer your students that favour the practical application of SD (profiles, concentrations, internships, summer courses, etc.)?
    4. Do you offer one or more learning activities that allow for the integration of the five SD key competencies? If so, which one or which ones?
    5. Are there other aspects of your program that could contribute to its recognition as an "SD-based" program?

INSTITUT HYDRO-QUÉBEC EN ENVIRONNEMENT, DÉVELOPPEMENT ET SOCIÉTÉ
(INSTITUT EDS)