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How to promote, support and experiment sustainability in higher education institutions? The case of LaSalle Beauvais in France

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Abstract: The Conference of University Presidents (CPU) and the ‘Conférence des Grandes Ecoles’ (CGE) established a common tool, incorporating uses and specific missions of institutions: governance, education, research, social policy, local integration and environmental management sites. Then, the research question is: how to place an integrated approach to sustainable development in the strategy of LaSalle Beauvais as this institute is an intermediate institution with academic research, development programmes and direct connections with companies and territorial activities? This paper reviews the concept of sustainability in Higher Education institutions and shows the actions which were implemented at all levels of our Institute and the encountered difficulties by combining two complementary methods (qualitative and quantitative) to respond to this question. It is the first time in the literature that the analysis of new perspectives on management, practices in teaching and research about sustainability in an engineer higher school is reported.

Keywords: sustainable campus; sustainable teaching and research; integration sustainability; LaSalle Beauvais.

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1 Introduction

Educating for sustainability remain of prime concern to UNESCO, education has a crucial part to achieve sustainability and stability within and among countries, democracy, human security and peace. “Education for Sustainable Development (ESD) implies providing the learners with the skills, perspectives, values and knowledge to live sustainability in their communities” (UNESCO, 2002).

In France, since 2009, institutions of higher education have engaged in the construction of an Action Plan for Sustainable Development. The Conference of University Presidents (CPU) and the Conference of higher education (CGE)¹ established a common tool, incorporating uses and specific missions of institutions: governance, education, research, social policy, local integration and environmental management sites.

Two conferences were organised by the CPU and the CGE on “Eco-campus, training and social responsibility” at UNESCO Paris in 2012, to address the following question: What strategies transition for European higher education institutions?

“Eco-campus 2: towards sustainable campus” is a second conference organised in 2013 that aimed to assist higher education institutions in the implementation of their corporate social responsibility policy considering both the needs of students, businesses, territories and more generally society. This conference will continue the work initiated in terms of social responsibility of higher education institutions at the international level, on the following issues: How to place an active approach to Sustainable Development (SD) in an integrated approach in the strategy of higher education institutions?

After an overview of the theoretical framework about the birth and evolution of the concept of sustainability in universities, we will focus on the Institut Polytechnique LaSalle Beauvais initiative to set up sustainability approaches. Sustainable development is a challenge for the future for which the French higher education institutions should be prepared. This study gives a real-life example through the strategy of LaSalle Beauvais.

Following this decision of introducing sustainability, in 2010, changes and innovations can be observed in the strategic management at different levels of the Institute. LaSalle Beauvais is focused on academic programmes for the training of engineers, master graduating students and technicians, in the fields of health and life sciences, agriculture, food and health, geology. As these domains are fully concerned by sustainable approaches, an integrated approach should concern the evolution of the academic programmes as well as institutional aspects and life on the campus.

An integrated strategy should include as well governance, life on the campus, relations with the urban area of Beauvais and the territory of Beauvaisis (and even larger: Picardie region, France, international networks), teaching, scientific research, relations with companies and communication.

Therefore, this paper proposes a theoretical framework of sustainability in higher education in Section 2; we present the research methodology in Section 3. The case study of LaSalle Beauvais, its strategies and actions in promoting sustainability in academic field and research are presented in Section 4. In Section 5, the paper presents the results of integrated approach evaluation and the encountered difficulties and some conclusions are drawn in Section 6.

2 Theoretical framework

2.1 *An historical perspective of sustainability in higher education*

Alshuwaiket and Abubakar (2008) underline some UNESCO declarations and the increasing number of universities which signed these declarations to indicate their commitments to sustainability (Wright, 2002). The Stockholm Declaration of 1972 was the first to make reference to sustainability in higher education (UNESCO, 1972). The second Tbilisi Declaration of 1977, proposed needs for the development of sustainability initiatives within the university and was the first declaration that offered guidelines for international strategies to the environment within a higher education context (Wright, 2002).

The third Talloires declaration grouped 300 university administrators in over 40 countries and dictated an action plan for developing sustainability in teaching, research, operations in colleges and universities (UNESCO, 1990a). One year later, the Halifax declaration added more voices of university administrators and paid more attention to the degradation of the earth's environment and the influence of poverty on the process (UNESCO, 1991). In the fifth Swansea declaration, the number of participating countries increased to 47 countries and another theme emerged about finding ways to respond to the challenge of discovering the balance between human questions for economic and technological development and environmental preservation (UNESCO, 1993).

Wright (2001) considered that the majority of signatory universities have made no attempt to implement the Halifax declaration within their institution. It is due to the complexity of this implementation. Wright (2002) proposed some examples of signatory universities showing their environmental policies and their needs of sustainable education. She raised this question: "*Does an institution need to sign an international declaration to move along the continuum of sustainability?*"

Alshuwaiket and Abubakar (2008) concluded in their paper that "the specific roles of universities in promoting sustainable development have been highlighted in a number of significant declarations, including the Kyoto Declaration (UNESCO, 1990b) that spurred international university community to create action plans to achieving sustainability, Agenda 21 (see Table 1) and Thessaloniki Declaration (UNESCO, 1997) which takes account of poverty, population, food security, democracy, human rights,... For a university campus to be sustainable, it must preserve the environment, stimulate economic growth, and improve society". To have some Declarations from 1972 to 2012 related to sustainability in higher education, Disterheft et al. (2013) summarise this chronology.

Table 1 reviews the evolution of sustainability by emerging themes in higher education.

Six years after the 'Our common future' document (Brundtland Commission, 1987) sustainable development became a major purpose for reorienting education. But there is no such a specific knowledge as sustainable development, which is fundamentally problem driven, solution oriented, and long term referred. Sustainability can be understood as an ideal systemic end-state which implicates many different corrective actions in the time. Education and Higher Education for Sustainable Development are not already fully conceived. Concepts and 'trial and error' approach still evolve in the specific framework conditions of higher education institutions. So, teaching sustainability is, *de facto*, partially self-referent, as the support of teaching should be a

sustainable university. In a sustainable vision, teaching sustainability should evolve towards sustainability teaching. This means that in order to help society to make the transition to sustainable lifestyle, Higher Education for Sustainable Development should be an example of sustainable lifestyle. In other words, praxis in sustainable development cannot be disconnected from teaching the concepts and accompanying graduating students to possess the key competencies.

Table 1 Evolution of sustainability in higher education

<i>Authors/Organisms</i>	<i>Definitions</i>
United Nations (1993)	Chapter 36 of Agenda 21, was the result of the United Nations Conference on Environment and Development held in the Earth Rio de Janeiro (Agenda 21, 1992), and posits sustainable development as a major purpose to reorienting education (Muhar et al., 2013), to raising public awareness in environmental matters, and promoting environmental training among educators (Wright, 2002)
Atkisson (1998)	“Sustainability is an ideal end-state. Like democracy, it is a lofty goal whose perfect realisation eludes us” (cited in Wright, 2002)
Brundtland Commission (1987),	Education for Sustainable Development (ESD) is a concept that emerged from the Earth Summit. “Sustainable university campus implies a better
Morin (1999), OECD (2005), UNESCO (2006)	balance between economic, social and environmental goals in policy formulation as well as a long-term perspective about the consequences of today campus activities (Newmen, 2006). Sustainability is characterised by economic growth based on social justness and efficiency in the use of natural resources (Lozano, 2006), and it includes the recognition that all stakeholders’ co-operation and participation are required to effectively achieve sustainability goals” (Alshuwaiket and Abubakar, 2008)
Corcoran and Wals (2004), Adomssent	Higher Education for Sustainable Development “is a still evolving, developing and adapting ESD concept for the specific framework conditions
et al. (2006), Gaough and Scott (2007) and OECD (2010)	at higher education institutions” (Muhar et al., 2013)
Cole (2003)	A sustainable campus community is defined as “the one that acts upon its local and global responsibilities to protect and enhance the health and well-being of humans and ecosystems. It actively engages the knowledge of the university community to address the ecological and social challenges that we face now and in the future”
Velazquez et al. (2006)	A sustainable university is defined as “a higher educational institution, as a whole or as a part, that addresses, involves and promotes, on a regional or a global level, the minimisation of negative environmental, economic, societal, and health effects generated in the use of their resources in order to fulfil its functions of teaching, research, outreach and partnership, and stewardship in ways to help society make the transition to sustainable lifestyles”
Waas et al. (2010), Wiek et al. (2011) and Disterheft et al. (2013)	Some scholars recognise the emergence of a new field or discipline ‘sustainability science’ or ‘science of sustainability’ (Clark and Dickson, 2003; Kajikawa, 2008). Sustainability science focuses on the dynamic interactions between environment and society, is problem oriented, and is grounded in the belief that knowledge should be ‘coproduced’ between science and society (Clark and Dickson, 2003). Waas et al. define university research for sustainable development as: “all research conducted within the institutional context of a university that contributes to sustainable development”

Formalising sustainability and defining how to train students to acquire key competencies, in order to manage change towards more sustainability, needs both to build a new field or discipline, that could be called *sustainability science* (Disterheft et al., 2013), and also to change the academic programmes for engineers by reshaping their contents. If teaching thermo chemistry within the framework of sustainable science is not yet conceivable, teaching it using sustainable problematic would be a first step.

2.2 *Case studies experiences*

The study of the first sustainability management master of business administration (Hesselbarth and Schaltegger, 2013) shows “that the vast majority of the students perceive that the ultimate goal of the MBA programme, to educate change agents for sustainability, has been achieved well”. Particularly, “the alumni reported substantial gains in motivation to implement sustainable development” and “the programme substantially contributes to the personal development of the individuals”. Furthermore, “the vast majority of alumni currently work in the field of sustainability management. 75% of all respondents mentioned that sustainability management has gained importance for their job”. It thus seems reasonable to conclude that the sustainability orientation is a decisive aspect of the career plans and paths of the alumni”. This effect was independent from the length of the career before the MBA. It can be inferred that including sustainability in an engineer/MSc programme can change the behaviour of these engineers in their job.

It is well known that agricultural sustainability is an important challenge. It is generally formulated by actors in agriculture “in terms of meeting the increasing demand for food of a growing and wealthier world population while simultaneously reducing environmental impacts. Strategies to meet this challenge include increasing agricultural yields, saving land and diverting agricultural produce from use for feed and fuel” (Spoelstra, 2013). Spoelstra compares such strategies based on natural sciences with alternatives captured under the umbrella of sustainability sciences, based on systems and mixed sciences approaches. These alternatives, theoretically and methodologically founded, have hardly led to an institutional change of the research constellation itself. Spoelstra argued that intermediary institutes due to their position between academia, practice, government and society are well positioned to incorporate sustainability science. “This requires boundary management beyond the traditional boundaries of biological and technical disciplines and their fields of application and retention of methodology and knowledge within with units of scientists with complementary knowledge and skills” (Spoelstra, 2013)

Few case studies proposed a fully integrated programme in science and technology for sustainable development. The Energy and Resources Institute (TERI) University at Dehli, promotes an integrative master named MSc Environmental Studies and Resource Management (ESRM). The programme is “built by seamless integration of sustainability concept that incorporates social, cultural, economic, scientific, technological, legal and policy perspectives to address issues related to environment and resource management by laying strong emphasis on experimental/empirical evidence” (Jain et al, 2013).

Could it be possible, useful, to gradually change a 5-year engineer /MSc programme in agriculture, in the North of France context, by integration of sustainable development aims? Are there specific difficulties depending on social, cultural, economic or even legal constraints? Can the French road map to ecological transition be a help?

Issues related to higher education for sustainable development in recent years, lead us to believe that sustainable strategies within an engineering school is an holistic approach which links governance and strategy, teaching and research and campus life. It is a work at both individual and institutional levels concerning all dimensions of sustainability.

We also propose some definitions of the principal three dimensions of sustainability mobilised in this paper:

- Sustainable campus: concerns campus life in LaSalle Beauvais, respectful of ecological, social and economic environment.
- Sustainable teaching: concerns the coherence between the sustainability requirements of courses and programmes and the competencies necessary to our future engineers.
- Sustainable research: Lasallian research teams are engaged for responding to calls for all projects integrating the notion of sustainability applied to the fields of the agriculture, health, geology and social sciences. This engagement is reinforced by our territorial partnerships.

In applying an integrated and transversal approach, these dimensions are interlinked in order to achieve a complete consistency with the Institute strategic plan.

3 Methodology

We present hereinafter the Green Plan (Article 55 of 3 August 2009 of the Grenelle 1 law) proposed by CGE-CPU, and the integration of sustainability in higher education, as presented in Section 2, in the development approach of our Institute strategy. From institutional approach to operational strategy three levels can be considered: campus life, teaching and research. Then, the valorisation strategy of the sustainable development approach is to be considered.

These data were collected from the ‘Sustainable Development Direction’ of LaSalle Beauvais created on September 2012. This service offers active contributions through common efforts to promote and establish best practices of sustainability for the campus. It is inspired by the sustainable university model of Velazquez et al. (2006), which consists of four phases:

- developing a sustainability vision for the campus
- incorporating sustainability in the mission of a sustainable university
- creating policies, targets and objectives
- applying strategies for fostering sustainability.

We proposed a French practical model in the following section that incorporates all the necessary phases of an integrated approach at LaSalle Beauvais. We also include in our qualitative data collection method, the results of a survey, which has been sent via email in May 2013 to all researchers and professor of LaSalle Beauvais Institute. It will be presented in Section 5. The goal of the survey was to evaluate the respondent’s perception of the process for implementing sustainability in our Institute. The survey consisted of eight questions designed in a closed- and open-ended response. The content

instrument was divided into three sections. Part 1 was dedicated to know if sustainability were enough integrated into courses, and how it was integrated, Part 2 gathered data about the efforts to further integrate sustainability approach. Part 3 targeted sustainability solutions to improve these practices.

4 The case study of LaSalle Beauvais

Institut Polytechnique LaSalle Beauvais is one of the leading Graduate School in France, founded in 1854, dedicated to Earth, Life and Environmental Sciences. The Institution has over 1750 French and international students on campus, including 650 MSc graduate students. Located 50 miles north from Paris, adjacent to 250-hectare of wood and experimental farm, the 10-hectare Campus offers classrooms, lecture theatres, labs, documentation library, experimentation plots, but although 1100 fully equipped apartments, student's office's, sports facilities and a restaurant.

4.1 LaSalle Beauvais programme: strategic objectives

Sustainability has been one of LaSalle Beauvais main concerns for a long time. On one hand, its area of expertise deals with the main challenges Humanity and World have to face now (food, biodiversity, water use, energy, climate change). On the other hand, the philosophy of his founder, John Baptist de La Salle,² let the institution a humanist mission – to fight against poverty through Education-, a way of working- together and by association – and values – respect, engagement, service – completely consistent with sustainability.

The formalisation of our approach started in 2010 with the nomination of one Responsible for Sustainability, depending from the Presidency of the institution, and the constitution of task forces including staff people and students. More than 30 people were invited to participate. At the same time, different actions were engaged at the level of Higher Education in France to promote the inclusion of sustainability in the strategy of institutions and universities.

Four Strategic axes were defined in order to capitalise the initiatives and structure the action plan for 2013–2018 period:

- to preserve and to highlight the biodiversity capital of the campus (pedestrian campus, arboretum, biodiversity management plan)
- to reduce the need of resources by controlling, recycling and reducing (balance sheet energy, energy and water meters, waste management, transport scheme, climate change conferences and energetic transitions' debate)
- to promote and develop a sustainable diet (local food market, healthy diet for students, gardening on the campus, kitchen and garden training for people)
- to develop the social opening of studies and students at LaSalle Beauvais campus (disabled students' integration, Jean-Baptiste Gagne scholarships, remedial scientific courses, 39,000 hours per year of Student Solidarity Commitment).

4.2 Sustainability practices in LaSalle Beauvais

LaSalle decided to be part of the pioneers to use the self-evaluation referential as a guide to build its action plan. The working groups elaborated a general policy note, approved by the board, and wrote the Green LaSalle Plan around four axes (see Table 2).

Table 2 Operationalising the Green LaSalle Plan (see online version for colours)

Governance and strategy	Ecological Exemplarity	Social responsibility	Information, education, research
To elaborate and monitor the strategy; to promote actions and communicate	To develop the campus while preserving environment	To promote and follow up actions related to ... at the level of staff members as for students; to improve links with stakeholders	Information, education, research

Each axe is divided into strategic and operational variables, each of them evaluated along a five-point scale from ‘awareness’ to ‘exemplarity’, using different indicators. After a self-evaluation of the actual level, groups propose target level for years, 1, 3 and 5.

This systemic approach, including all different stakeholders, mixing top-down and bottom-up propositions and a strong communication to explain and train people, to promote concrete actions has allowed instilling all members of the community with sustainability. An active website animation with forum allowed people to ask for information but also to propose initiatives through the ‘Ideas Box’. The participation to the leading working group for the development of sustainability in higher education has been also of valuable interest to share practices (CGE SD).

In 2012, the Institution decided to create a Direction for Sustainability, stakeholder of the strategic plan. The four Working groups have elaborated the ‘Agenda 21’ which identifies the main 19 commitments in which LaSalle Beauvais involved. Each commitment was divided into three actions. The different tools available allow forecasting that at each level for different time horizon, actions are planned, engaged, evaluated and communicated. Regular surveys directed at students, faculty members or staff are conducted to measure the way sustainability is understood and integrated in their activities or daily life.

4.3 Academic field. The example of agricultural engineer programme (Master Degree)

Wiek et al. (2011), through their relevant literature on key competencies in sustainability, identify five key competencies for the graduating student to possess: system-thinking competence; anticipatory competence; normative competence; strategic competence; interpersonal competence. Many links exist between these competencies.

Engineering degree from the ‘Institut Polytechnique LaSalle Beauvais’, with Specialisation in Agriculture is a five-year programme to get a Master Degree. The transformations of this programme, in accordance with the Bologna process, began on the end of the year 2010. Teaching programmes have been organised over the last 5 years with the aim of the acquisition of such key competencies, in addition to the classical competencies, which are necessary to be an engineer in agriculture.

The structure of the education courses, for the bachelor degree, includes five teaching units which gradually evolve, during the six semesters:

- agriculture in its environment
- food industry and green chemistry
- experimenting and working in a company
- interacting with others
- the functioning of living system.

Each teaching unit can contain different academic subjects, organised by ‘modules’ (training courses) which are thematically homogeneous; for example: Self-Knowledge

and Professionalism, English, Metrology, General chemistry, Health and Safety at Work, Genetics, Logic, Farm Analysis, Microbiology, Plant Physiology, Pedology, Common Agricultural Policy, Linear Model, etc...

The aim of such an organisation of the training courses is to gradually offer the possibility to acquire the competencies for a sustainable approach:

System-thinking competence: Systemic knowledge includes conceptual relations as structure-function, cause and effect, correlation, regulation, and also more anthropologic concepts as decision, motivation and perception. From the first year, general overviews are combined with analytical subjects, generally in the 1, 4 and 5 teaching units. It is well known that system-thinking needs time to be acquired. So, our hypothesis is that such training courses have to be present in each semester from the first one, if possible one in each teaching unit. In that case, evaluation is generally a study or a report.

Anticipatory competence: To anticipate is to be able to craft pictures, images, stories, of the future, including quantitative and qualitative information, to have a comprehensive analysis of them, and to be able to grasp the dynamics. This key competence cannot really be acquired at the bachelor level but for specific talented students. Nevertheless, through many studies or reports, for instance a study about recent innovations in agriculture, the students begin to practice how to project into the future their today's representations. Training courses on-business intelligence are proposed only in the seventh semester that means at the beginning of master degree. Such competence needs a large range of knowledge, integrated in system thinking. It leads to anticipatory works.

Normative competence: It is "the ability to collectively map, specify, apply, reconcile, and negotiate sustainable values, principles, goals and targets" (Wiek et al., 2011). This competence can be developed through the acquisition of normative knowledge, which are scattered in all the teaching units. An important module presents on the fifth semester the basic concepts about sustainability and how socio-ecological systems ought to be developed (ISO standards). Quality is also a specific module and the standards already defined are studied.

Strategic competence: it can be defined as "the ability to collectively design and implement interventions, transitions, and transformative governance strategies towards sustainability" (Wiek et al., 2011). A specific module is affected to business strategy. At the end of their 5-year programme in agricultural, the young engineers have a strategic approach of their domain. As the better strategies for implementing sustainable world are still for debate, we keep open the debate, although the students know some proposals, and the French plan for the ecological transition (French Government, 2013).

Interpersonal competence: 10 hours of training courses (conferences and tutorial classes) are focused, every semester, on personal and interpersonal competence. It begins the first semester with the MBTI® personality inventory (Myers and McCaulley, 1985), which helps the graduating students to better know themselves and their spontaneous management style. During the fourth semester, before they leave the campus for four months in a foreign country, a specific module is focused on interculturality Management, interrelationships and psychosociological risks are studied throughout the course. During the 9th semester, they practice how to manage their own work research.

Master degree is divided into seven fields in which the population of the students divides up. Two of them are specifically focused on sustainable agriculture: ASET (Agro ecology, soils, waters and territories), and EIA (Entrepreneurship and innovation

in agriculture), the first one from the point of view of the territories, and the second one from innovative entrepreneurship. ASET is focused on the sustainability of territories according to the environmental criteria. EIA adopts a holistic and interpretative approach of sustainable development (Sidiropoulos, 2013). Both Masters degree add the institutional dimension (Golusin and Ivanovic, 2009). In both cases, sustainable development is not so much a goal or an endpoint but the starting point. Specifically, for EIA, our idea is to make of sustainability the starting point for all students activities (academic, educative, and personal) according to “the Talloires declaration 1990, keeping in mind that moral responsibility is accountable for the effects of actions on the natural environment and the future generation” (Wright, 2002).

The other fields contain specific modules on sustainability, but with other specific aims: food industry, plant production, animal production, piloting and management of companies, marketing and sales development.

4.4 *Research*

Two examples are presented although all research teams deal with sustainability.

4.4.1 *PICAR-T research team*

The main aim of PICAR-T team³ is to better understand the place of agriculture, food industry and rural space in the post-industrial economies of the present as well as their evolution in time and space. More specifically, the scientific programme of the team targets to build keys for understanding innovative process in a research of competitiveness understood as a mode of sustainable insertion in the market economy. For this team, innovation is a creative process leading to registration of a novelty, technical or organisational, in a socioeconomic environment.

Then, the main objective of the team is to understand how and why these innovative processes can be territorially situated and thus what are the potential vectors for sustainable competitiveness? How to identify these innovative logics coupled with some territorial logics? The fundamental research hypothesis is to consider that the territory establishes a socially constructed locus, a concomitant space of interactions and learning in the processes of innovation, which is able to take different modalities of expression that we propose to track down. Two dimensions, which can be additional, seem promising in term of potentialities of research: the characterisation of territorial resources facilitating the innovation (including resources of mediation), and the territory understood as a vector of learning allowed by proximity (geographic, organisational, social, cognitive). The team is multi-disciplinary and interacts with agricultural sciences and human science departments.

Through the topic of CSR (Corporate Social Responsibility) the PICAR-T research team has developed an original research programme (Bowen, 1953; Carroll, 1999; Freeman, 2010). The objective of this programme is to identify, at the French food SME level, barriers and needs for skills, knowledge and network learning competencies for two categories of management system standards: food safety and social responsibility.

For social responsibility, the main focus is on the ISO 26000 standard launched in 2010 and translated in France in 2011. The objective is to extend these results towards new sectors and new countries at an international level.

4.4.2 HydrISE research team

The HydrISE team⁴ focuses on the transfer of minerals in surface environments, rock to surface and groundwater through the soil/plant system.

The biogeochemical cycles of minerals to the soil-water and soil-plant interfaces allows us to answer fundamental questions about the operation of water systems and ecosystems agro ecology applied on soil fertility and environmental engineering on the reduction and remediation of chemical pollution of soils and waters from agricultural sources (i.e., inputs: phosphates, metals,...) and industrial (metals). The project team HydrISE focuses on mobility and speciation of metals and phosphorus structuring in three axes:

- the transfer of water and minerals into the groundwater and surface water
- the fractionation and speciation of metals in natural waters and soils
- the ecology and biogeochemistry of ecosystems and agro ecosystems.

- 1 The axis 1 aims to characterise the flow paths both at the surface and in the saturated zone and non-saturated. Naturally present in water systems (soil geochemical background), chemical elements can also result from human activities: metal pollution due to industrial or mining activities, transfers of mineral and organic inputs related to agricultural activities. Implementation of hydro geological investigation methods or geophysical ones lead to the modelling of flow in saturated area, especially chalky ones. Spatial analysis techniques are also used for mapping surface water transfers in order to study parts of the biogeochemical cycle.
- 2 The axis 2 develops analytical speciation laboratory tools or specific biosensors. For in situ investigation knowing fractionation of metals associated with the physico-chemical environmental conditions (pH, redox potential, organic materials) helps in understanding the mobility of these elements.
- 3 Through axis 3, HydrISE studies the influence of populations and plant communities, and eco agro ecosystems on mineral chemical modification of natural and /or anthropogenic soils.

Specifically, they study the influence of the spatial variation of chemical and biological soil properties on the variation of concentration mineral in plant biomass (i.e., metal accumulating plants) and the structure and productivity of plant communities (ability to sequester carbon).

These researches could have many practical uses by answering to: what is residence time in a geological formation of such chemical forms of the metals? Are they bioavailable for plants? Can soil be depolluted? Some tools for ecological and agro- ecological engineering can be developed.

5 Results

According to the integration strategy, LaSalle Beauvais shows a participative strategy that will gradually materialise at all levels: sustainable campus, teaching and research.

5.1 Sustainable campus

Since the ‘Grenelle 1 law’, university and high school have decided to work in network to share best practices. Every year, one campus is selected to welcome the R2D2 (‘Rendez vous des Référénts Développement Durable’, i.e., meeting dates for sustainable referent). In 2014, LaSalle Beauvais has been selected to organise this seminar. During two days, LaSalle Beauvais has shared its approach of sustainable development to 60 other higher education schools and universities. It was also a special sharing time between our networks (Working group, conference). Another example: the direction sustainable development of LaSalle Beauvais takes part of the working group ‘label’. Thus, LaSalle, with six other campuses, will be audited (by ‘Ecole des Métiers de l’Environnement’ and ‘Université Paris Grand Ouest La Défense’) to test the first version of the label in November 2014; and will audit another campus (‘Ecole des Mines de Douai’). After this first test, the label will be official thanks to the collaborative work.

Progress has been recorded in the different axes thanks to projects realised in 2012–2013 (see Figure 1):

- *governance*: creation of the sustainable development direction and dedicated budget
- *teaching*: sustainable development has been a pillar of the educational reform
- *environmental management*: management plan for biodiversity; creation of a pedestrian zone of the campus to promote green transport
- *social policy and regional presence*: training plan for employees; skills mapping of employees; integration of student with disabilities

Each axis is divided into strategic variables. For example, the ‘Social policy and regional presence’ axis is divided into five strategic variables (see Figure 2).

Figure 1 Self-assessment of sustainable development of LaSalle Beauvais (see online version for colours)

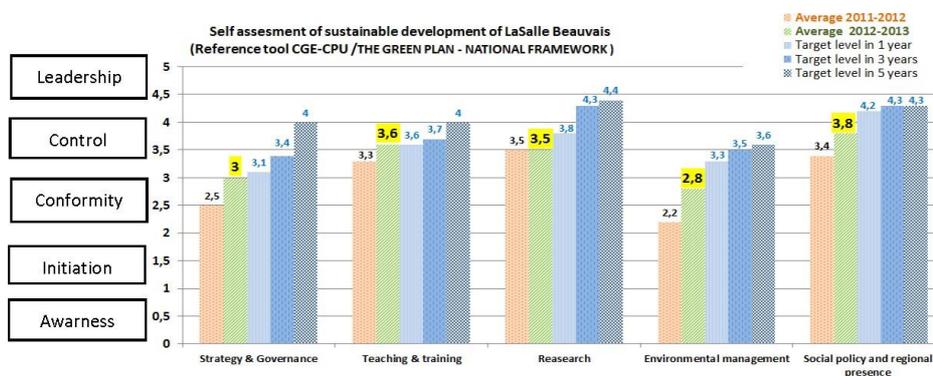
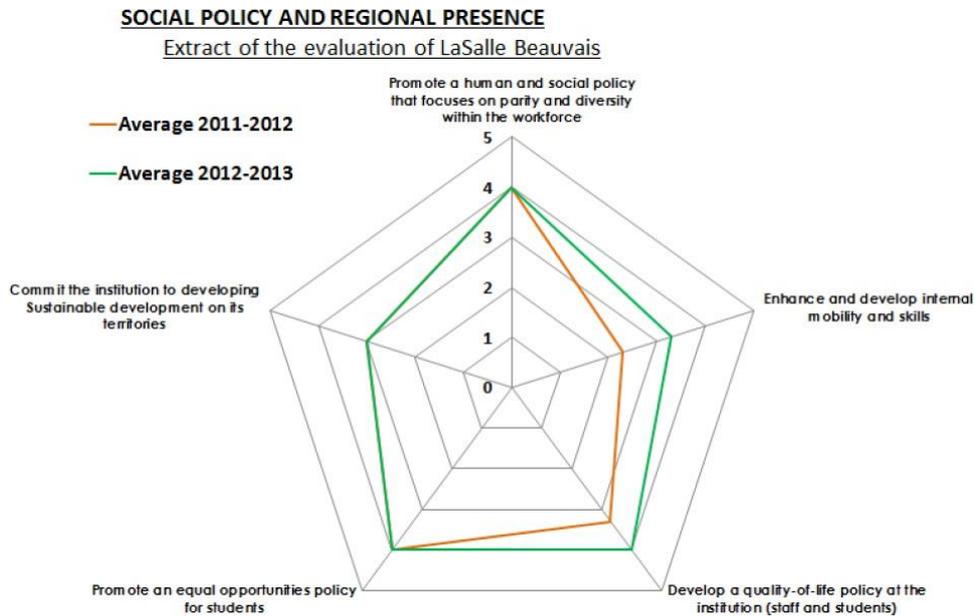


Figure 2 The evaluation of LaSalle Beauvais between 2011–2013 (see online version for colours)

From the campus life perspective, sustainability is carried out through the achievement of Environmental certification ISO 14001-certified farm, and student initiatives including over 40 sport, social, cultural and recreational associations. For example, the Solidari'terre association acts on the themes of environment topics and solidarity. The organisation of numerous yearly events including charity and humanitarian activities, conferences, workshops contribute to the local sustainability. According to Dahle and Neumayer (2001), it can be “concluded therefore that one of the most important measures that needs to be undertaken to overcome barriers to greening is to raise the environmental awareness within campus communities”.

5.2 Sustainable teaching

The priority of higher education institutions is to train students to become decision-makers aware of the issues of the sustainable development (SD). The survey realised in May 2013 (participation rate: 63%) permitted to identify several items:

- 54% of the teachers think that SD is well integrated in their courses.
- However, one-third of the teachers consider SD is not sufficiently integrated because it is difficult (32%); very difficult (4%); or almost impossible (11%). Their discipline being too scientific and technical oriented (mathematics, differential equation ...).
- 43% of the teachers think that time should be devoted to discussion.

At the academic level, we observe active participation of the teaching staff to train the students to become actors of change and tomorrow's responsible managers. Escalating the level of integration into courses increases student engagement and results in stronger impacts on students' sustainability views, attitudes and, to a lesser extent behaviours.

This impact varies according to age, gender and culture. But increasing student knowledge and attitudes towards sustainability, while necessary, is not sufficient to stimulate more sustainable behaviours. In addition, teaching SD is much more credible if the professor is attentive to the fact that his (or her) daily behaviour sound in agreement with what he (or she) teaches.

5.3 *Sustainable research*

At the research level, the production of knowledge and analytical framework will be useful to policy makers, teaching and business players for their strategic thinking. The participation in various scientific projects (regional or international) is related to sustainability, for examples: the sustainable development PIVERT⁵ programme, the adhesion into regional scientific cluster like group SFR⁶ Condorcet and the GIS⁷ research group concerning the role and place of technology in engineering sciences. According to Adom̄ent (2013), “the transdisciplinarity [...] value can be found in knowledge communication rather than in knowledge production”.

6 **Conclusion**

Regarding its foundation commitments, LaSalle Beauvais shows a differentiation strategy based on sustainable development as added value for the institute and for the training programme. We share Sidiropoulos point of view (2013), who considered sustainability as a question of value, and therefore changes through education could be a long way. This differentiation based on the sustainability has increased and depends on ‘continuous’ involvement. In addition to its commitments, LaSalle Beauvais multiplies public awareness actions and demonstrations for students and its staff members. LaSalle Beauvais is characterised by an integrated strategy of the Green Policy, within its internal different structures (governance, academics, research, and campus). This integration leads to various changes and improvements of the training programme and the campus lifestyle behaviour. It is supported by a dynamic participative process involving different group works on interaction, as well as professors, researchers, administration or association combined with strong partnerships with stakeholders such as regional and international organisation, which enhance the image, performance and the sustainable development of the Institute. The effectiveness of this sustainable development approach depends on a better articulation between the sustainable policy, the target programme of involved organisation, the empowerment and continuous improvement toward an inclusive strategy (including the societal dimension), which place the individuals as the actors of change (responsibility). According to the UNESCO declaration (UNESCO, 2012; Brodhag, 2014) there is a need of ‘equitable, inclusive, green society’ because “Green economy is not enough, achieving genuine sustainable development calls for more than green investments and low carbon technologies”. This need of inclusive aspect for a sustainable development can be also illustrated by the Gandhi opinion “Be the change you want to see in the world” which strengthen the role of university in implementing an effective sustainable development including a socially responsible economy combining an environment-friendly development and a social equity.

The major difficulties to implement SD are that, for each domain, it is necessary to modify at the same time the contents and the posture, the direction/meaning and the

behaviour. On the campus, the students come for five years and have a behaviour of consumers asking for services. So, it seems necessary to move not too fast, with the aim of tuning finely research, teaching, governance and lifestyle on the campus. Implementing positive feedbacks needs time.

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Notes

¹In agreement with the educative French system, The conference of the University Presidents (CPU : "la Conférence des Présidents d'Université") is a non-profit organisation which gathers the presidents of universities and leaders of some French higher education schools, and the conference of higher education engineering (CGE: "la Conférence des Grandes Ecoles") the one who gathers most of French establishments of private higher education and research and some foreign ones, in contact with the world of companies and the actors of the economy, in a perspective of improvement of the social prosperity and sustainable development.

²*John Baptist de La Salle* (April 30, 1651–April 7, 1719) was a French priest, founder of the Institute of the Brothers of the Christian Schools. Born to a wealthy family in Reims, France, he dedicated his life to the education of poor children; he started many sustainable educational practices and free schools 'together and by association'. He insisted on gratuity for all, regardless of whether they could afford to pay. Finally, he founded in 1685 what is considered the first normal school — a school whose purpose is to train teachers — in Reims, France.

³'Unité de recherche' PICAR-T UP 2012-10-103.

⁴'Unité de recherche' HydrISE UP 2012-10-102.

⁵"Picardie Innovations Végétales Enseignement Recherche et Technologies" is a 10 years French state supported program devoted to the new valorisations of biomass for the future.

⁶SFR Condorcet "Structures Fédératives de Recherche" recognized by the CNRS since 1st January 2012, has 23 public and private research organisations and is headed by Professor Christophe CLEMENT, University of Reims Champagne-Ardenne.

⁷GIS "Groupement d'Intérêt Scientifique" association of different regional research units.