

Innovative Approach and Tools for Sustainability Assessment of Academic Programs: An Analysis on Academic Programs of the University, Within a Vision of Sustainable Development Challenges

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Abstract:- The innovative knowledge threshold notably moved education from conventional to digitalized that was developing state of arts for academic programs of higher education institutions. The large scale development circumstances consequently move up the significance of deliberative combination of education, Knowledge, technology, and sustainability practices to the knowledge platforms, e.g., ePLANETe. In fact the concept of 'ePLANETe' an innovative knowledge platform and its functionalities as an experimental digitized platform for contributing sustainable assessment of academic programs of any higher education institution(HEI). Besides, this paper assessed and define the common sustainable development challenges of higher education, and identified effective tools of 'ePLANETe' that is enable to practices sustainability assessment of academic programs through the collective and deliberation methodologies. How to evaluate sustainable challenges of academic program in higher education institutions is the question that addressed in this paper. Through the evaluation of academic programs, the digitalized platform 'ePLANETe' addressing these challenges that will be explored. To investigate the effectiveness of knowledge tools and approach of 'ePLANETe', I have studied on benchmarking sustainable challenges and digitized pedagogical content as well as evaluation of academic programs of two public universities in France through the 'ePLANETe' evaluation space. The investigation indicated that the effectiveness of 'ePLANETe's tools and approach perfectly fit for the quality assessment of academic programs, implementation of sustainable challenges, and dynamic balance of ecosystem within the university's communities through 'ePLANETe' evaluation process and space. The study suggests to the relevant higher educational institution's authorities and policymakers could use this approach and tools for evaluating sustainability and improve the sustainability competencies of academic programs for quality education.

Keywords:- ePLANETe, Deliberation, Evaluation, Competencies.

I. INTRODUCTION

Today there are many systems for connecting digital objects, such as Wikipedia and social networking tools, e.g. facebook, twitter, and instagram and the internet itself, that far exceed 'ePLANATE' in connection performance. What makes 'ePLANATE' unique is the exceptional range of sustainability related objects galleries and doorways, the content-driven and user-friendly features of the process of creating objects within each gallery, and the interconnection from one object to another through system existing filtering process. This has the cumulative effect of integrating the entire system in to a novel participatory and reflective social model into a transparent and evolving expression of the shared intentions of the participants in the educational and environmental spheres, advising, supporting as tools for sustainable development assessments.

The outline the platform now called 'ePLANETe' supported by the 'ePLANETe' blue association and available on the internet to structure collaborative learning activities knowledge mediation and deliberation support in the controversial and interdisciplinary fields of sustainable development in education. The 'ePLANATE' is an innovative knowledge doorway to digital solution of science technology and innovation (STI) for implementing sustainability and dynamic balance of ecosystem in the course of communities of ePLANATE blue association. It has a solid approach of multi-faceted digital solution of education assessment, innovation, and sustainability challenges of higher through practicing digital eco-system model. It has different gateway as well as surface for communication and capacity building resource that are complementary by drawing affect user behaviors and outcomes moreover the portal is intended to assist the identification of best practices at specific levels of action and to encourage knowledge exchanges in virtual community and thus to improve sustainability performance through the engagement of collaborative activities of different sorts [1], [2].

II. HISTORICAL REVIEW

A background prompt has been conceded out to go back over the development of ‘ePLANETe’s gateway of innovative Knowledge mediation. Indeed, the ‘ePLANETe’ has its roots in partnerships with the KerBabel Team since 2000 at C3ED (until 2009) and then at the International REEDS Center (2010-2015), that is called international research center of the University versailles St-Quentin-en-Yvelines. Today, it is made up of 24 distinct Galleries, each allowing the creation, consultation and operation of one or more classes of electronic "objects", the latter responding to a variety of discovery opportunities for deliberation support tools for sustainability assessment of academic programs as a deliberation matrix. Objects can be linked to each other, in logic of reciprocity that can be found par excellence today in social networks. At the top level, the Galleries are grouped together by Thematic / Functional Spaces (number 12) which provide the methodological context for the operation of the tools and Object Galleries that they host. Access to the Spaces and Galleries is made through 6 large "Doorways" which articulate: the User Communities (the TOUTATIS door), the principles of technical organization (KERBABEL), economic, environmental, and political dimensions (the FAIRGROUND, MERLIN and CAMELOT gates, respectively), and, learning and training activities (TALIESIN). To conclude, we have illustrated the use of all of ePLANET's galleries by mobilizing skills for deliberation around “Knowledge Hot Spots” - that is to say, the structuring of controversial subjects characterized by uncertainties, high stakes and the diversity of perspectives, values and positions within a university or organization. In my observation regarding on effectiveness of substantially shifted academic programs of UVSQ to UPSaclay towards the vision of sustainability practices.

A. Transition of Academic Programs UVSQ : Master SETE

The UVSQ’s significant achievement to the academic programs on environment and sustainable development are the spirit of offered courses. These academic programs mainly run and organized by the RREDS, The research center of UVSQ. It has responded to the challenges of environment, and climate change by creating an interdisciplinary observatory (OVSQ); The Observatory of Saint-Quentin-en-Yvelines(OVSQ) whose mission is to support research, observation and training based on high quality laboratories in the field of climate science, atmospheric sciences, humanities and social sciences[2]. The 35 programs from bachelor to master degrees represent a very unique offer in the framework of the national and European higher education and research system[1]. In 2015, the academic program’s policies have been changed and merge to contribute the programs with the cluster of University Paris Saclay(UPSaclay). The Sciences of the environment, territory, and economy (SETE) is a big domain, including main challenges of UVSQ’s academic programs and acting as leading roles of the courses sustainability practices. That’s why some programs changeover from SETE to the Territory Management & Local Development (GTDL), UPSACLay

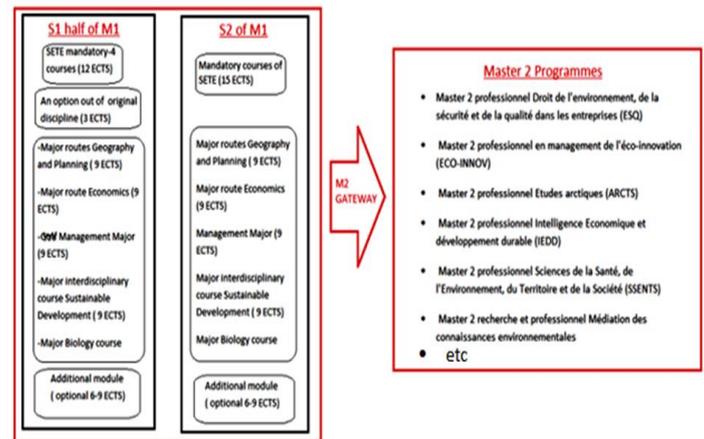


Fig.1 Formal Gateway of Master SETE Department

B. Moderated Academic Programs UPSAlay: GTDL

The GTD is a multidisciplinary academic department that is run by UPSaclay and organized by UVSQ. The main challenges of this department are the territorial, environmental and local development with the view point of understanding of physical phenomena and analysing social, political, economic and legal impact

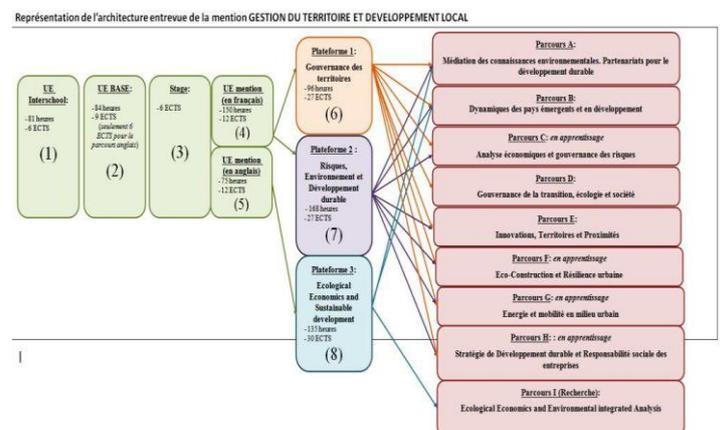


Fig.2 Territory Management & Local Development (GTDL)

Therefore, from 2015, UVSQ’s constructed Programme has re-constructed by UPSaclay. In this regard, during my Pd.D thesis and stay at the REEDS Research center, I did examine the effectiveness of an innovative knowledge mediation platform’s evaluation space to assess the sustainability of the academic programs of UVSQ and UPSaclay.

III. THEORETICAL BACKGROUND AND METHODOLOGIES

The paper presents the concept of ‘ePLANATE’ as an innovative knowledge platform for the assessment of the sustainability of academic programs. By emphasizing the importance of sustainability in higher education, the research make a contribution to the literature on sustainability in education sector e.g., university, research center, etc. In order to implementation plan and strategies of the University Versailles St-Quentin-en-Yvelines(2004-2015), and the University Paris Saclay(2015-2020) get together built a academic program partnership for sustainable development

practices. In this purpose both may use a common knowledge mediation platform 'ePLANETe' due to its useful features. The 'ePLANETe' provides-

- An innovative tools for evaluating academic programs and documenting teaching material, named TALIESIN DOORWAY
- A tools and approach for quality assessment of higher education institution's strategic objectives using deliberation methodologies
- An innovative and original approach of academic programs for quality of education in the perspectives of sustainable development.

This paper has designed a strong action-research component, exploiting the collective action as per existing works using Deliberation Matrix, and collaborative space functionalities of ePLANET's system on Benchmarking sustainability assessment of academic programs, e.g., GTDL and to M2 MEDIATION of University of Versailles Saint-Quentin-en-Yvelines(UVSQ) & University of Paris Saclay (UPSaclay), France

A. Deliberation Matrix: The system 'ePLANETe' - KerBabel and on-line kerDST

The methodological frame adopted to characterise evaluation methods along four[3]: (1) the OBJECTS of evaluation attention (e.g., institutions, sites, strategies, actions...); (2) the framing of the PERFORMANCE GOALS AND CHALLENGES; (3) the identification and roles of the different "ACTORS" OR STAKEHOLDERS in the evaluation process; and (4) the type of INDICATORS OR "SIGNALS" OF PERFORMANCE. By observing these four dimensions, we can characterize the process for selecting, recruiting, and integrating indicators in to an aggregated indicator or score. Developed by KerBabel research team, the logic of the 3D deliberation matrix allow for a didactic representation of the decision processes and outcome made by each category of stakeholders for each option or scenario being evaluated to quality performance issues. The scope of quality performance issues, the categories of stakeholder, and the list of objects to be evaluated and compared must be determined by KerDST[3] user, who builds the issues outline as the designated issues owner for counselling support.

In the 2006 version of KerDST, it is essential to specify a "small number" of fundamentals along each of these three axes [1],[3]. The limitation to a "small number" (typically between 3 and 8) is partly for ergonomic reasons of on-screen conception [3]. It is justified also on cognitive terms: individuals typically can "hold" up to 5 or 7 objects as separate items in their minds and Building a deliberation with more than 8 elements along a single axis becomes unwieldy both on-screen and in cognitive terms that is constraint to "small numbers" along each of the structuring axes for "building the problem" can, in principle, be relaxed by introducing internal structure along each axis[3]. For instance, one strength offers a hierarchical construction of "top goals" and "subgoals" for categorizing the quality-performance criteria [2].We will return the question of *interior construction* along each of the three constitutive

axes, but focus here on the *roles of the actors* in the evaluation process and the **mobilisation of indicators** to compose the evaluation[1],[3].

The kerDST process is provides for three main phases or forms of participation by real persons as "actors" in the evaluation[3]: The first phase of stakeholder participation is to "build the problem", a process that, one way and another, culminates in the definition of a 3-D array: (1) the key stakeholder or social actor classes, (2) the relevant spectrum of performance issues and (3) the range of evaluation objects (e.g., higher education establishments, business strategies, industrial sites, projects, territorial development scenarios, technologies, investment options...) to be evaluated. Many people may participate in conversation before or throughout the actual process of 'building the problem via the online deliberation support tools, even though one person will be empowered as a special KerDST User to be the problem holder. Second coat is for those who, in their capacity as legislators representing a group of stakeholder, pass judgement on each evaluation alternative e.g.,as a site or scenario in relation to each performance criterion or issues. Each stakeholder should provide a judgement (satisfying, poor, unacceptable, etc.) of each alternative scenario in connection to each of the important concerns or decision matter by focusing on each cell of the Deliberation Matrix. In this procedures, one obtains a for each Actors Class or Stakeholder, a layer of the matrix that consists of rectangular array of cells where each row indicates(issue by issue) the assessment provided by a particular class or stakeholders class for subsequent options or scenarios. The ability to expand the evaluation undertaken and motivate each cell level judgment by reference to indicators constitutes the third types of stakeholder participation. This method can be applied to a variety of surface, such as the range and weighting of indicators for a 'basket' of indicators within a 'cell' of the DM, as well as user community assistance in creating lists or banks of indicators that are appropriate for the current challenge

B. Online Deliberation Support Tools- KerDST: Multi-Stakeholder with Multi-Criteria Assessment.

In this system, exercises or tasks are organized using a 'grid' or arrangement in three dimensions, structured by specifying selected problem:

- Assessment/ Government issues: few noticeable quality/performance issues
- Main types of actors or stakeholders: the pragmatic delineation of 'interest' and collective identity
- Political options or possible future prospect: small number of options for actions and decision scenarios

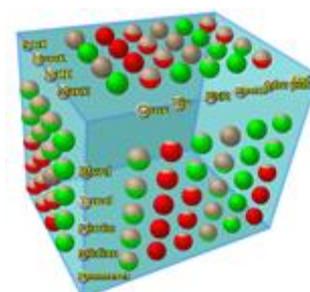


Fig 3 Online Deliberation Support Tools

If the task is to evaluate a specific activity or to compare several situations, then the user can specify a site or sites rather than scenarios [1]-[3]. From the above three aspect of the KerBable deliberation support process, we have understood that the forms of genuine stakeholder engagement are intrinsic to the process of mobilizing indicators and evaluating or reporting evaluation results at the unit level and then aggregated at a higher level connection.

If we continue to use KerDST as a methodological case study, we need to examine more carefully the interplay between assessment structures and participant contributions. In 2006, the KerDST online deliberation support tools integrated two main functions into a basic framework for comparing Multi-Stakeholder, Multi-Criteria Assessment.

First as already mentioned, are the mobilizing indicators by way of a base for the CELL BY CELL judgements. These indicators are listed and accessible online ‘ePLANETe’ interfaces with the deliberation matrix in a matching “KerBabel™ Indicator Kiosk”. In this course of participatory evaluation, user of the deliberation matrix can participate to the formulation of catalogue.

The second is the acceptance of multiple participants as member of the online deliberation community, each of whom is associated with one of the stakeholder categories specified in the deliberation matrix for the social choice problem under consideration and who contributes to the formation of composite judgement for the CELLS of the DM corresponding to that specific stakeholder category. We identify the four primary ways to utilize the potential of the KerDST system by combining these two qualities. The tabular arrangement that follows summarizes: “The simplest method is “colouring in the cells” by single representative of each stakeholder category of by a single expert acting on behalf of all stakeholder categories for a qualitative multi-stakeholder multi-criteria assessment of a situation or option for action (this is Variation ‘A’ in the schema)”.

This opens up naturally [3]: towards variation ‘B’, where multiple participant contribute to a composite judgment of each issues e.g., each CELL. On the other hand, towards variation ‘C’, where a single expert acting on behalf of all stakeholders creates a ‘non-participatory’ evaluation for supporting societal goals. Noted that the “default option” suggested for color codes is RED for bad, YELLOW for moderate, and GREEN for good; but users can if they wish define their own list of judgments and corresponding colors.[2]

Table 1 kerDST Users, Reichel, Bureau, Legrand, O’Connor & Sunde(2007).

KerDST Typology of Deliberation Processes with the “KERDST” Deliberation Support Tool © KerBabel™ C3ED (2006)		ROLES OF THE INDICATORS FOR EVALUATION	
		NO INDICATORS “Colouring in the Cells” (with or without commentary) <i>For each Cell, a single judgement (by colour) is registered for each stakeholder category (via discussion or expertise)</i>	WITH INDICATORS The judgement for each Cell of the Matrix is informed by a “Basket of Indicators”. <i>The colour of the Cell depends on the signification and relative weighting accredited to every indicator to the ‘basket’</i>
COMMUNITY OF ACTORS: USER	CLOSED For the extended community, the deliberation is not open <i>A single (synthetic) judgement is registered for each actor/stakeholder category[2]</i>	A. QUALITATIVE ASSESSMENT(Multi-stakeholder AND Multi-criteria)	C. NON-PARTICIPATORY INDICATOR BASED ASSESSMENT
	OPEN An extended user community. <i>Multiple participants within each stakeholder category may contribute to the evaluation[1],[2]</i>	B. QUALITATIVE MULTI-ACTOR PARTICIPATORY ASSESSMENT (WITHOUT INDICATORS)	D. MULTI-ACTOR PARTICIPATORY INDICATOR-BASED ASSESSMENT

IV. RESULT AND ANALYSIS

A. Auto Evaluation Method of Strategic Demonstration on Academic Programs [2]:

We have developed and proposed an innovative way, tools and approach of assessing sustainability on academic Programs of UVSQ and UPSalay by the ‘ePLANETe’s Deliberation Matrix. It has been established concluded by Dr. Jean Mark DOUGUER, Program director of MEDIATION, UVSQ, and Co-ordinator of GTDL Program of University Paris Saclay. There are 3 axes in the deliberation matrix that applied for the auto evaluation process [1]:

- There are four PERCEPTIONS: [2] (A) Research / Means; (B) Research / Objects; (C) Education / Means, (D) Education / Objects.[2]
- Performance ISSUES[1]: (built using crossings of the triangle: Education, Sustainable development and Innovation): (1) Towards inclusive and equitable quality education and long-life learning for all (2) Promoting education for sustainable development, (3) Transformation of education landscape: (4) Sustainability of Higher Education, (5) Sustainable Development goals (17 goals), (6) Building capacities, Empowerment, (7) Improving learning processes and outcomes, (8) Green

Economy, (9) Technology facilitation mechanism for building effective partnerships for education.[1]

- The OBJECTS TO COMPARE are organized around four themes[2]: MEDIATION program, UVSQ, and Co-ordinator of GTDL Program of University Paris Saclay (UPSalay)

It is necessary to choose from 1 to 5 indicators to assign a value, a subjective weight, and a comment (if possible) in order to reach a conclusion. The suggested values are assigning below figure.

- Choose "Dark green aimed at **"Strongly in Favour"**
- Choose "Green" aimed at **"Favourable"**
- "red" aimed at **"Poor"**
- "Orange" aimed at **"Medium"**
- "white" aimed at **"Do not know"**
- "blue" aimed at **"Not Applicable"**

Fig.4 Indicators baskets in the Deliberation Matrix [2]

Quantitative or Qualitative indicators me be used to express one’s judgment in order to be more explicit about the evaluation process. The indicator is used in its broadest sense, which is to say it encompasses all information related to the PERCEPTIONS that has a stake in expressing its opinion. in this case, the meaning that the indicator allows to prove in order to issues the judgment is what matters, not its quantification and qualification.

Object to compare (research/means) / Issue 1				
Indicators	Value	Subjective Weght	Comment	Jugment
Indicator 1 ²		15%	Lié au transport routier /Linked to road transport	
Indicator 2		15%	DCO < 125 mg/l	
Indicator 3		15%	Diversité des espèces	
Indicator 4 ²		20%	Baisse 10%	
Indicator 5 ²		35%		

Fig.5 Object to Compare [2]

For a given perception, the results of the evaluation of all the objects to the compared and the stakes (or slice of the matrix) at presented at the first level of interpretation in the following form:

	Object to compare 1	Object to compare 2	Object to compare 3	Object to compare 4	Object to compare 5
ISSUE 1					
ISSUE 2					
ISSUE 3					
....					

Fig.6 First level of Interpretation [2]

There will also be a ‘slice ‘of the matrix for other categories of actors. At the second level of interpretation, we will be able to identify for each PERCEPTION/OBJECTS/ISSUES Crossing the indicators and the arguments used to make the judgment (see the figure on how to compose a judgments). We can analysis the results as flows. For the object of comparisons 1, we obtain the following judgments at the first level of interpretation:

	PERSPECTIVE 1	PERSPECTIVE 2	PERSPECTIVE 3	PERSPECTIVE 4	PERSPECTIVE 5
ISSUE 1					
ISSUE 2					
ISSUE 3					
....					

Fig.7 Judgments of First level Interpretation [2]

We will also be able to access the second level identify, for all the PERCEPTION /ISSUES Crossed. the indicators and arguments that were used to make the judgments.

B. Outputs of the Quality Evaluation Process

Two output results of the automatic are presented below in the ‘ePLANATE’ System. The general views of the result of the auto evaluation are a multi-colored picture, respectively for the academic programs GTDL and MEDIATION. For details interpretation see below figure.

Fig.8 Academic Program of Auto Evaluation: GTDL & MEDIATION

Fig.9 Auto Evaluation of Education and Knowledge Economy

V. CONCLUSION

As per the findings, the paper affirms that recent demand of academic programs notably influenced the sustainability competencies by the proper evaluation process.

Thus, the terms academic program, Sustainable development and, sustainability assessment have closely inter-connected. However, due to the features of the university's length and size, sustainability issues of academic programs have sophisticated assessment process. In the context of system "ePLANATe" provided the key benefit of the Deliberation Matrix Methodology: on-line system 'kerDST' that is designed to enable progressive development of an evaluation process which is accessible to a broad spectrum of user and experts, yet still accumulated over time. Moreover the distinguishing feature of kerDST, the same methods can be used for assessing any research question, no matter the facets of the large question. In this way, the entire participant involved become familiar with common resources (e.g., knowledge, tools and method) and more fundamentally a shared understanding of what "social choice" is as a multi-actor, multi-criteria decision situation with academic program sustainability. There is a special feature to support user involved in the evolution of sustainability practices by designing resources (knowledge, tools and methods). It is doubtless that this system has the capability of dealing with sustainability assessment of university academic programs by using of its evaluation space.

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