GREENCOMP Applied to Subject Areas
Initial report of working group of project CALOHEE2 - www.calohee.eu

Carla Salvaterra, University of Bologna and Paolo Villani, University of Salerno (editors)
Alfredo Soeiro, University of Porto (coordinator of working group)

1. Proposal for Inclusion of GreenComp in Learning Outcomes Frameworks

CALOHEE (Comparing Achievements of Learning Outcomes in Higher Education in Europe - www.calohee.eu) was the initial project that originated CALOHE2. Both are projects that try to define Learning Outcomes for programs in Teacher Education, Civil Engineering, Physics, Nursing and History. Given the importance of Sustainability the working groups of the five subject areas tackled the merging of the existing frameworks of learning outcomes for programs of Level 6 of EQF with GreenComp framework.

As a result of the working group activities during the three meetings of 2022 three - non exclusive - options to proceed for each project Subject Area of the Learning Outcomes Frameworks

a) Incorporate GreenComp requirements in each Subject Area Framework adapting its descriptors;
b) Create specific new competence(s) to add to the existing Subject Area framework (possibly adding new dimensions);
c) Join GreenComp with the existing Subject Area Framework by emphasizing where to incorporate learning outcomes when designing specific programmes.

For the third option Table 1 shows examples for five Subject Areas (History, Civil Engineering, Physics, Nursing and Teacher Education) for the level of bachelor or level 6 of the European Qualification Framework. Examples were taken from the Learning Outcome Frameworks. (CALOHEE, 2017).

For each Subject Area - in the white column - it is presented the list of the dimensions and references of dimensions of the frameworks. In the green column the references are connected to the respective GreenComp framework dimensions by using different colours: (Green: Embodying sustainability; Violet: Embracing complexity; Blue: envisioning sustainable futures; Red: Action for sustainable futures)

Table 1 - Inclusion of GreenComp in Existing Frameworks

Level 6 EQF/BAchelor	History		Physics		Nursing		Civil Engineering		Teacher Education	
KNOWLEDGE AND UNDERSTANDING	Human Beings 1.1 1.2 1.3	1.1 1.3 1.2, 3.1 4.1			The professional values 1.2 1.4 1.6	1.2 2.2 2.2				

KNOWLEDGE AND UNDERSTANDING APPLICATION			Problem solving	2.1, 2.2, 2.3	Nursing practice and clinical decision making 2.1 2.5 2.6 2.7	1.1 2.2 2.3 3.3	Problem solving	2.1		
CRITICAL REFLECTION, JUDGEMENTS, SYNTHESIZING AND DESIGN	Theory and Concepts 3.3 Interdisciplinarity 4.1 4.3 5 Initiative and Creativity	2.2 2.3 2.1	Scientific Culture Ethics	3.1, 1.2 4.1, 4.2, 4.3	Professional values and the role of the nurse	1.4 1.6	Decision Making	2.3	Ethics 5.3 5.4	4.1, 4.2, 4.3
COMMUNICATION			Communication Team Working	3.1, 4.2 4.2, 2.1	Leadership and Team Working 5.1 5.5	4.2 3.3 (?)	Team Working	4.3	Communication	4.2
LIFELONG LEARNING	Professional Development 7.3	4.2 4.3	Professional development	1.1, 3.2					Professional Development 6.3	4.2

2. How to Apply the Relationships between GreenComp and Learning Outcomes Frameworks

It was found that within subject areas these have already implicit connections (sometimes even explicit) in which it can be defined some transversal common issues which connect to the broader understanding of sustainability beyond purely environmental issues. For example, when considering the following statement from Green Comp, 2. Embracing complexity in sustainability, 2.2 Critical thinking:

> "To assess information and arguments*, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions."

It is observed that in different subject area of the learning outcome frameworks there can be three main (not exclusive) approaches to connect to this statement:

1) Civil Engineering, Nursing and maybe Education will have a main focus on the way in which the discipline and its practice is adapting to changing social needs, new knowledge /awareness and theoretical underpinnings of value frameworks
2) Physics will have a main focus on the way information is organized, analyzed and fits with existing frameworks and models, and on the way the results are evaluated to look for improvements in the model.

3) History will have a main focus on how approaches to sustainability are changing through time and are connected to the conceptual and value frameworks in which they have developed.

Given the results of the analysis it is clear that connecting the Learning Outcomes Competence Frameworks of the five subject areas with the GreenComp is a very useful exercise. The results of the exercise can help enhancing a wider approach even going beyond environmental sustainability and the addressed subject areas. Establishing the relationship between GreenComp and the Learning Outcomes frameworks can promote the integration of the concepts of sustainability with all education and training frameworks to aim at achieving sustainable development goals.

References

CALOHEE, "Comparing Achievements of Learning Outcomes in Higher Education in Europe", project funded by European Union, 2017, retrieved from www.calohee.eu.
GreenComp, "GreenComp: the European sustainability competence framework", Joint Research Centre, retrieved from https://joint-research-centre.ec.europa.eu/greencomp-european-sustainability-competence-framework_en, 2022.

_____

Examples of connections of the Subject Areas Frameworks to GreenComp Framework

Civil Engineering
Dimension 3: Design Subset 2 L6_3.2 Safe, **sustainable** and of low impact designs
K6-3.2 Define and describe key aspects of safety, **sustainability** and impact on society and environment related to civil engineering phenomena and to the ethical obligation and social responsibility of professional engineers. (it means that the designer should reconsider his priorities: valuing sustainability and critical thinking, see the example @GreenComp, pag. 39)

Nursing

From the updated Nursing Learning Outcomes Framework:
Critical reflection, judgements, synthesizing and design

Knowledge

Demonstrate current knowledge and understanding of relevant theoretical frameworks, concepts, methodologies and/or practices to gather, evaluate and interpret field related and societal information. This includes ethical awareness, intercultural issues, political and governance awareness, decision making, and other sustainable developments.

Skill

Apply appropriate theories, concepts, methodologies and/or practices and field related and generic skills and competences, including digital ones, to analyze, synthesize, and make informed judgments while taking into account relevant social, cultural, scientific and ethical issues and challenges.

Wider competence

Demonstrates the ability to evaluate and reflect on new knowledge and contribute to discourse to identify and implement individual and collaborative ways to either move forward and/or solve field and societal challenges and problems.Dimension 1 The professional values and the role of the nurse

Subset of Competence 1 **The professional values and the role of the nurse,** 1.4 Within the scope of his/her professional practice and accountability, is aware of the different roles, responsibilities and functions of a nurse, and is able to adjust their role to respond effectively to population/patient needs.

1.6 Is able to justify and articulate the relevant theoretical and research underpinnings to their professional practice

Framework
S6_1.1
Demonstrates the ability to respond appropriately and effectively to professional, moral, ethical and/or legal dilemmas and issues in day to day practice.
C6_1.1
Within the scope of their professional practice and accountability, demonstrates the ability to adjust their role to respond effectively to, and where necessary and appropriate can challenge current systems to meet population/patient needs.

Physics
From the subset 5: L6_4.5 **Creative and innovative thinking**
K6_4.5 : Organize knowledge of physics in a way that facilitates links between different concepts and ideas. • GC 2.2 K1 Knows that our understanding of sustainability is always evolving • GC 2.2 S2 Can analyze and assess arguments, ideas, actions and scenarios to determine whether they are in line with evidence and values in terms of sustainability. S6_4.5: Reflect on own solution to a problem and compare it with others' solutions; acknowledge alternative ways to look at a same problem • GC2.2 S2;Can analyze and assess arguments, ideas, actions and scenarios to determine whether they are in line with evidence and values in terms of sustainability. • GC 2.2 S4 Can reflect on the roots and motives of decisions, action and lifestyles to compare individual benefits and costs with societal benefits and costs. • GC 2.2 A3 Takes an evidence-based perspective and is ready to revise it when new data emerge • GC 2.2 A4 Is willing to accept and discuss sustainability questions, issues and opportunities S6_4.5: Devise creative ways to address a problem, issue or task, and to exit critical issues or stuck situations. • GC 3.3 K2 Knows that there is no single solution to complex socio ecological problems, but rather different alternatives depending on time and context. • GC 3.3 S1: Can adapt to different approaches when working on sustainability • GC 3.3 A4 : Is flexible, resourceful and adaptable in coping with unexpected environmental changes.

Education
6_6.1 Ability to critically examine educational research and developments (publications, events, resources, etc.) in search of solutions for challenges experienced in own classroom Dimension 2: Design and management of processes of learning, teaching and assessment S6_2.4 Ability to design and apply assessment tasks and transparent criteria (rubrics) for measurement and evaluation C6_2.1 Capacity and commitment to critically reflect on the impact of teaching decisions on the learner's future in order to make responsible syllabus design and enhancement choices K6_4.3 Critical understanding of social media and communication technologies, as well as their impact on learners and society C6_5.1 Capacity and commitment to critically reflect and work on consistency of own personal and professional identity

History
DIMENSION 3. Theories and concepts Subset 3 Periodization and other national and historiographical frameworks
Level6_3_3Competence Connect explanations of historical and societal issues => (including approaches to sustainability) and processes to the conceptual and value frameworks in which they have developed