NCSE 2019 Webinar Series

Key Competencies for Sustainability Degree Programs: Additional Questions and Answers

Webinar Date: Wednesday, April 3, 2019

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Background of the Project

Questions:
- Does this mean that NCSE is accepting the work of Wiek, Withycombe in their article as the sine qua non on the topic of competencies?
- Can you please say something about the role the ISSP has been playing in relation to their core competencies for sustainability professionals…. Is the sense that this document is not relevant or is it being include as one of the key supporting documents?

Answer:
- We build off of the Wiek et al. 2011 article because:
    - It is the result of a systematic literature review and consulting process (including a full-day workshop at the AAAS Conference).
    - It is used to guide academic program development on the bachelor, master, and PhD level at universities in the US and internationally.
    - The number of citations (457 (CrossRef) and 928 (Scholar))and number of downloads (14,000) suggests great resonance in academic community.
- Literature review in 2011 includes the ISSP report from 2010 (Willard M, Wiedmeyer C, Flint RW, Weedon JS, Woodward R, Feldmand I, Edwards M (2010) The sustainability professional: 2010 competency survey report. International Society of Sustainability Professional.) We are also aware of the material available on the website, e.g., https://www.sustainabilityprofessionals.org/issp-job-task-analysis-summary. If newer reports are available, please share. One of our on-going discussions in the Community of Practice is the degree to which sustainability programs train sustainability professionals focusing on careers related to ISSP or Association of Climate Adaptation Professionals versus a broader set of overarching competencies for a wide range of career options. As mentioned above, we are using ISSP resources, but are not limiting ourselves to a programmatic pathway directly to ISSP certification.
- Research on key competencies in sustainability is ongoing. To help us better understand the developments in this dynamically developing field we're using
    - a) the Delphi-Study, involving experts who research and teach on key competencies in sustainability,
    - b) the broader engagement process (like this webinar), and
    - c) the findings from other significant research efforts such as the $1.6 millions multi-year study on key competencies in sustainability (Educating Future Change Agents).

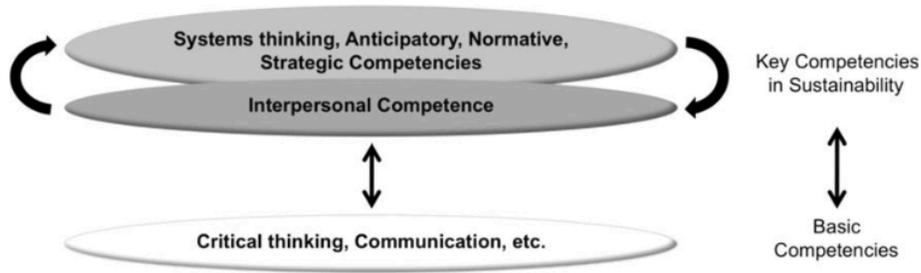# Key competencies in sustainability, basic academic competencies, topical sustainability knowledge

Question:
- I'm struck by the lack of discussion in the sustainability competencies literature about the need to understand the grand challenges that students will be working on in their

particular places (eg., the **facts**, **perspectives**, **players**, **policies**, etc related to each challenge). To me, this is not exactly systems thinking (although it would involve some degree of systems analysis). Knowledge of grand challenges seems to be foundational for other competencies?

Answer:

- **Key** competencies build off of **basic** academic competencies. Basic academic competencies include e.g., critical thinking, academic writing, conducting a literature review, basic research skills, etc.

Fig. 3 A layered set of competencies in academic sustainability education, linking basic competencies and key competencies in sustainability, as well as recognizing interpersonal competence as cross-cutting key competence in sustainability

- Key competencies are complementary to topical knowledge, such as the aspects mentioned related to the grand sustainability challenges. Key competencies are not defined by the topical knowledge, they are defined by their contribution to a problem-solving effort. Some sustainability problem-solving approaches start by framing the sustainability issue: They employ systems thinking to analyse socio-ecological systems (what is happening, why, how, what are the **facts?**) and values thinking to frame the problem (for whom is this a problem, why?). Strategic thinking competency helps to explore the **policies** and strategies, interpersonal skills help to engage with the **players** and **actors** involved and mediate across their perspectives ... [please note, in bold we highlighted the terms from the question.]
- From a topical perspective, sustainability can be a laundry list if we look at the various facets involved in sustainability issues and grand challenges. Sustainability competencies can be applied to any sustainability challenge.
- In developing key competencies, context and case studies are critical. Problem-solving, strategic planning etc. can only be practiced with application to a challenge. It is implicit that many of the challenges used in a curriculum will be associated with these grand challenges. However, we have no inclination to dictate how students will be introduced to these challenges. We anticipate specific learning activities will do this, and our plan is to help shape some of these activities as the next phase after the general competencies consensus is reached.

Questions related to specific key competencies

Questions:
Systems thinking

- Katja discussed bringing in more disciplines, specifically the **humanities**, to address sustainability in a field. I would love to hear a specific example of where you were able to **bring a diverse background** to solving a sustainability problem. The program I am from, **engineering**, has traditionally had problems with this.
  - Answer: Specific examples include using visual arts and sculpture, poetry, and storytelling as components of community engagement, scientific communication and science/policy discussions. For example, in promoting more efficient agricultural practices, having elders from indigenous society discuss the relationships of their cultures to the earth provide valuable perspectives. Art exhibits displaying personal perspectives on water conservation techniques, forest restoration or other sustainable practices are others. Courses (or workshops) in ethics and environmental philosophy help build normative competencies for students. Environmental history courses at national and international scales provide valuable perspectives at multiple spatial and temporal scales.

Values thinking

- Is the work used to build the AAC&U VALUE rubrics being used in the consideration of some of these areas/metrics, such as **Ethics** and **Intercultural knowledge**?
  - Answer: We have leaned on the National Academies consensus report on developing indicators for undergraduate STEM education, which in turn incorporates the AAC&U work.
- Although, I do agree that the Earth will continue as it will with or without humanity, and will do as it will, I would suggest that **sustainability needs to be about more than people, but also maintaining ecosphere and ecosystem services** on which humanity relies for survival, also preventing the 6th great extinction as much as possible. If we only promote economic value of sustainability education and training, and sustainability of humanity, then we aren't really promoting true sustainability.
  - Answer: We understand sustainability as a nested system with social, economic and technical systems being tightly coupled, yet embedded in our natural life support system. Socio-environmental synthesis is a critical part of multiple competencies and works from an underlying assumption of the basic need for both social and environmental sustainability. How that assumption gets fleshed out, we believe, is a function of specific learner activities developed by individual or groups of faculty. We are trying to avoid a single prescriptive pathway.

Future thinking

- Engle et al included **Creativity and Imagination** in their competencies. This relates to the question above about Mary Oliver, et al. Can you comment on that?
  - Answer: Creativity/imagination has been indicated in the competencies literature as a part of interpersonal, anticipatory and strategic competencies. In this sense, it is a capability that is entailed in various competencies and can be seen as a cross-cutting capability. We have not done further research into the question whether creativity is a competence or core competence (interlinkages between concepts, methods, skills and attitudes). Creativity / imagination is a way of thinking / knowing in the same overarching way that "critical thinking",

"self-directed learning", or "information literacy" are (see Engle, Elyzabeth W., Susannah H. Barsom, Lydia Vandenbergh, Glenn E. Sterner III, and Theodore R. Alter. "Developing a framework for sustainability meta- competencies." *International Journal of Higher Education and Sustainability* 1, no. 4 (2017): 285-303.) As noted above poetry, literature and the other humanities have integral roles to play in achieving sustainability competencies, and the application of creativity/imagination to the social and natural sciences is also fundamental.

Strategic thinking

- Have you reviewed the Social Change Model of Leadership - 7 C's of Leadership? We are using this model in a Sustainability Leadership program at the undergraduate level…… It comes out of Student Affairs but is quite helpful in terms of the **"soft" skills** of **self-awareness**, values, ethics and etc. Good activities as well. One of the C's is Controversy with Civility….
  - o Answer: We are familiar with this leadership model. We agree that it is an effective technique in developing intrapersonal and interpersonal competencies. Here is a link from Drexel University.

Interpersonal thinking

- You mentioned you are developing **intrapersonal** and **cultural** competences more. Can you saw more about what is included under each of these categories? Thanks.
  - o The question under strategic thinking competencies is a good place to start. We see that interpersonal competency is one of the sustainability core competencies where most research activity has been focused on recent years, aimed at detailing intra- and cultural competencies.
- Is the work used to build the AAC&U VALUE rubrics being used in the consideration of some of these areas/metrics, such as Ethics and **Intercultural knowledge**?
- I'm very interested in learning more about the **intrapersonal** competencies you mentioned. Could you speak more about how you understand that currently?
- Also, I don't see a strong focus on **communication** in the **Interpersonal** and Problem-solving categories. Can you say more about why not?
  - o Two-way communication as well as collaboration and cooperation are seen as foundational to interpersonal competence. As mentioned above, communication skills are developed through learner activities addressing sustainability challenges in a group setting. They are integral parts of these activities, but we don't feel comfortable dictating what these specific activities should be. Also see comments under Future Thinking.
- Please comment on where and how **coping with intense emotional stress** as part of a competencies framework. Given that people in our professions face civilizational challenges nearly every day, sometimes to their individual detriment (see article below on "climate grief"). People lacking a core competence in coping skills may not be long-term advocates for sustainability. https://www.nbcnews.com/health/mental-health/climate-grief-growing-emotional-toll-climate-change-n946751

- o Agreed! Coping skills and self-care are fundamental parts of what we have started calling intrapersonal competency. We are still exploring how to best describe this competence.
  - o For a course example see: Burns, H. (2016). Self-Care as a Way of Being: Fostering Inner Work in a Graduate Sustainability Leadership Course. *Ecopsychology*, 8(4), 250-256.
  - o For a literature review see: Brundiers, K., & Wiek, A. (2017). Beyond Interpersonal Competence: Teaching and Learning Professional Skills in Sustainability. *Education Sciences*, 7(1), 18.
- Engle et al included **Creativity and Imagination** in their competencies. This relates to the question above about Mary Oliver, et al. Can you comment on that?
  - o See comments under future thinking.
- Have you reviewed the Social Change Model of Leadership - 7 C's of Leadership? We are using this model in a Sustainability Leadership program at the undergraduate level…… It comes out of Student Affairs but is quite helpful in terms of the **"soft" skills** of **self-awareness**, values, ethics and etc. Good activities as well. One of the C's is Controversy with Civility….
  - o See comment under strategic thinking.

Problem-solving competency
- Also, I don't see a strong focus on communication in the Interpersonal and **Problem-solving** categories. Can you say more about why not?

Answer:
- The competence menu has been detailed for each competency in the literature review (Wiek et al. 2011) – please also check the appendix for additional details.
- Currently, these competence menus are being reviewed and revised as part of the above mentioned activities and studies (Delphi Study, Educating Future Change Agents Project, NCSE outreach activities). Revisions have been identified. These include
  - o additional inclusion of theories and concepts as well as methods and attitudes pertaining to each of the existing competencies;
  - o proposals for new core competencies that are a core competency (not another capacity or skill), are *distinct from* and *complement* existing competencies, and fill a gap in sustainability problem-solving efforts.
- The sixth competency is the problem-solving competency … involving the skillful and purposive combination of all competencies (and related experts) in a problem-solving process.

Pedagogical approaches to support competency acquisition

Questions:
- Do students learn co-creation through internships and real-world experience, or are those skills practiced in a lab setting?

- o Co-creation has to begin during the undergraduate core course sequence, as students explore with faculty how their degree program can best help them to achieve the programmatic core competencies. This means making explicit these core competencies and the interrelationships between learning activities and these competencies.
  - o Great illustration of such scaffolding is provided by Furman University: Habron, G. (2019). Scaffolding Applied Learning and Sustainable Development Goals in the Furman University Sustainability Science Program. *Sustainability: The Journal of Record*.
  - o For examples see: https://sustainability.asu.edu/real-world-learning/
  - o Brundiers, K., Wiek, A., & Redman, C. L. (2010). Real-world learning opportunities in sustainability: from classroom into the real world. *International Journal of Sustainability in Higher Education*, *11*(4), 308–324.
- You acknowledged that **teaching attitudes** is challenging, but do you have further thoughts about general models or ways it can be approached? If it's as central as knowledge and skills, it needs to be a focus in the classroom. But how?
  - o Research by Jason Papenfuss points to the important role of contemplative practices as a way to increase self-awareness.
- The point about aligning learning activities with the competencies is an essential one. For those who haven't seen it, here is a set of resources for such activities: https://www.springer.com/us/book/9783319285412
- How do we **teach** and assess/measure attitudes for the "values thinking competence"?
  - o See example offered by Furman University
  - o Dr. Sonja Klinsky and Dr. Aaron Golub developed the introductory course into "values thinking" for the undergraduate program at the School of Sustainability: "Equity, Justice and Sustainability". We would be happy to make introductions.
- Katja discussed bringing in more disciplines, specifically the **humanities**, to address sustainability in a field. I would love to hear a specific example of where you were able to **bring a diverse background** to solving a sustainability problem. The program I am from, **engineering**, has traditionally had problems with this.
- We are proposing a capstone/service learning project to help students get experience in applying their learning/skills in sustainability. Do you have any best practices guides to help faculty mentor students in this area?
  - o We did a comparative study across 6 different programs using capstone projects: Brundiers, K., & Wiek, A. (2013). Do We Teach What We Preach? An International Comparison of Problem- and Project-Based Learning Courses in Sustainability. *Sustainability*, *5*(4), 1725–1746. https://doi.org/10.3390/su5041725
- I want to know more about "radical pedagogies" Katja! Can you give some examples?
  - o *See Jason Papenfuss's dissertation abstract: Inside-Out Pedagogies: Transformative Innovations for Environmental and Sustainability Education.*
  - o *See website: Transgressive learning.*

Pedagogical approaches to <u>assess</u> competency acquisition

Questions:
- The presentation started with mention of how we know core competencies have been met. There were several mentions of the "consensus statement", but I have heard little about how, or whether, the core competencies should be **evaluated**.
- How do we teach and **assess/measure** attitudes for the "values thinking competence"?

Answer:
- See above and also:
  - Trencher et al., 2018. Trencher, G., Vincent, S., Bahr, K., Kudo, S., Markham, K., & Yamanaka, Y. (2018). Evaluating core competencies development in sustainability and environmental master's programs: An empirical analysis. Journal of Cleaner Production, 181, 829–841.
  - Wiek, A., Bernstein, M. J., Foley, R. W., Cohen, J. M., Forrest, N., Kuzdas, C., … Withycombe Keeler, L. (2016). Operationalising Competencies in Higher Education for Sustainable Development. In M. Barth, G. Michelsen, M. Rieckmann, & I. Thomas (Eds.), *Handbook of Higher Education for Sustainable Development* (1st ed., pp. 241–260). New York, NY: Routledge.

Framing of sustainability

Question:
- Does "sustainability" encapsulate climate adaptation, mitigation, resilience, etc.?
  - **Answer**: Sustainability science literature has developed a set of characteristics that define a sustainability problem. As shown below, these characteristics are not bound to a topic. Sustainability problems are those that are
    - urgent (because of the impacts, harm, irreversible effects);
    - place-based
    - complex: complex cause-effect structures reaching across
      - ecological, social, economic systems,
      - geographical/administrative scales (local, national, regional, international)
      - temporal scales
    - contested (people have different views)
    - uncertainty
    Literature: Gibson, R.B. Sustainability assessment: basic components of a practical approach. *Impact Assess. Project Appraisal* **2006**, *24*, 170–182. Wiek, A.; Ness, B.; Brand, F.S.; Schweizer-Ries, P.; Farioli, F. From complex systems analysis to transformational change: A comparative appraisal of sustainability science projects. *Sustain. Sci.* **2012**, *7 (Suppl 1)*, 5–24
  - Embedded in the very notion of sustainability education/competencies is the assumption that sustainability is still achievable. And while the mainstream certainly

perpetuates this idea, there is a growing body of work (within and on the margins of academia) that sees sustainability as a myth, given social and environmental trends. How is this addressed in this set of competencies? How do you yourself stand toward this critique of "sustainability" as a normative goal? [...]

No, that wasn't the issue; I'm not talking hypotheticals of 600 degree warmer planets or the basic idea of entropy; it's the very real critique that the way things are going is headed us in a territory where the very idea of sustainability is a form of denial - Foster 2015; Hamilton (var.); Bendell; Andrews var.; Schellnhuber and other climate scientists discussing the implications of 4+C warming for the possibility of having a civilization at all. They view the sustainability discourse as a form of denial. Or as Bluehdorn would frame it, "sustained unsustainability."

- o We recognize many sustainability challenges as "wicked problems" including the concept that they may not have unique or even any complete solutions. Nonetheless, it is critical for sustainability/environmental/social educators to build a framework or scaffolding or set of lenses to help view socio-environmental systems. Sustainability competencies can fit this bill.

- Although, I do agree that the Earth will continue as it will with or without humanity, and will do as it will, I would suggest that sustainability needs to be about more than people, but also maintaining ecosphere and ecosystem services on which humanity relies for survival, also preventing the 6th great extinction as much as possible. If we only promote economic value of sustainability education and training, and sustainability of humanity, then we aren't really promoting true sustainability.

Sustainability Professionals and sustainability actors in the broader movement / ecosystem

Sustainability professionals as graduates of genuine sustainability programs or sustainability-related programs

- **Question**: Is there a differentiation in thinking between sustainability problems/work/outcomes in the private sector vs sustainability problems/work/outcomes in the public sector?
- **Answer:**
  - o From the initial results from the Delphi Study we see the need to differentiate between sustainability efforts *at work* as a specific focus, which needs to be embedded in the context of sustainability efforts in one's own everyday life.
  - o Public and private sectors might frame sustainability problems and corresponding solutions spaces differently, depending on their perspectives and values; the outcomes could be measures against the SDGS.

Sustainability actors engaged in sustainability change processes

- **Question**: Were/are the poet Mary Oliver, the sculptor Aurora Robson, or the painter Julie Heffernin competent sustainability professionals?

- Has anyone analyzed the rhetoric/communication of noted sustainability champions (Arundhati Roy, Bill McKibben, Wangari Maatthai, Meadows, Macy, etc) to determine whether these six competencies are present in their work?

Answer:
- Alan AtKisson in his Ted-Talk offers a great metaphor that describes the **ecosystem** of various and distinct types of change agents involved in sustainability transformation processes (*How to be a more effective agent of change*). Also, the literature of sustainability transformations and transition studies identifies different roles and expressions of sustainability change agents (see e.g., Wittmayer & Schapke, 2014; Hesselbarth & Schaltegger, 2014, Harre 2018).
- We are trying to create a profile of the graduates of genuine sustainability programs. These outcomes might be different from someone who elects to be an artist as sustainability actor. The artists mentioned in the question may primarily identify with the idea of being an artists engaged in sustainability and using the arts as a vehicle to inspire and support sustainability change. They might identify less with the concept of being a sustainability professional working for the EPA or a local NGO. While there are many roles for sustainability actors active in sustainability change processes (artists, writers, political activists, scholars, champions…), not everyone elects to be a sustainability change agent who identifies with the competencies presented here.

References

- **Question**: Can we get full citations for: Wiek et al 2011, UNESCO 2011, Lang et al 2012, and NAS work on sustainability curriculum?
  - **Answer:**
  - NAS work on sustainability curriculum is still in development. A good place to monitor NAS developments is at https://www8.nationalacademies.org/pa/projectview.aspx?key=51336
  - Lang, D., Wiek, A., Bergmann, M., Stauffacher, M., Martens, P., Moll, P., et al. (2012). Transdisciplinary research in sustainability science: practice, principles, and challenges. *Sustainability Science, 7*(0), 25–43.
  - UNESCO – United Nations Educational, Scientific and Cultural Organization (2015): Rethinking Education. Towards a global common good? http://unesdoc.unesco.org/images/0023/002325/232555e.pdf
  - Wiek, A., Withycombe, L., & Redman, C. L. (2011). Key competencies in sustainability: a reference framework for academic program development. Sustainability Science, 6(2), 203–218.

- **Question**: Are there any resources you are aware of (and could share) that provide foundational literature/media clips/learning materials along with the competencies they address in sustainability?

- o **Answer:**
- o Lozano, R., Merrill, M., Sammalisto, K., Ceulemans, K., & Lozano, F. (2017). Connecting Competences and Pedagogical Approaches for Sustainable Development in Higher Education: A Literature Review and Framework Proposal. *Sustainability*, *9*(11), 1889.
- o Garcia, M.R., Junyent, M. & M. Fondolleda (2017). How to assess professional competencies in Education for Sustainability?: An approach from a perspective of complexity, *International Journal of Sustainability in Higher Education*, Vol. 18(5), pp.772-797.
- o Stecher, B., and Hamilton, L. 2014. Measuring Hard-to-Measure Student Competencies. A Research and Development Plan. Rand Corporation. **DOI:** https://doi.org/10.7249/RR863

- **Question**: We are proposing a capstone/service-learning project to help students get experience in applying their learning/skills in sustainability. Do you have any best practices guides to help faculty mentor students in this area?
  - o **Answer:**
  - o https://hub.aashe.org/browse/topics/campus-engagement/
  - o https://hub.aashe.org/browse/topics/curriculum/
  - o your institution must be a member of AASHE