The potential for Networked Learning in Environmental Assessment teaching in Sweden

Anna Longueville, Charlotta Faith-Ell

Mid Sweden University, Department of Ecotechnology and Sustainable Building Engineering (EHB), anna.longueville@miun.se, charlotta.faith-ell@miun.se

Mari Kågström

Swedish University of Agricultural Sciences, Department of Urban and Rural Development, mari.kagstrom@slu.se

Abstract

This paper explores the current teaching of Environmental assessment (EA) in Sweden. EA processes aim at identifying the potential advantages and disadvantages of a proposed action mainly applied in physical landuse planning and for the approval of projects. EA not achieving best practice has been an issue within research for a long period of time. At the same time, the competence requirements on EA practitioners are very high. Recent court verdicts have raised a concern about the competence status among Swedish practitioners in the field of EA.

The aim of this paper is to explore and analyse the current teaching in EA in Sweden in order to develop this field through influence from other disciplines, in this case Network Learning (NL). The paper builds on two different analyses. The first being an analysis of Swedish EA courses. The second being a comparison of the International Association for Impact Assessment (IAIA) Best Practice Principles for Teaching, and the Design dimensions for NL.

The analysis shows that most of the courses are leaning more towards practical training than integration of research contribution and research training. This means that there is a risk that the students will leave the university with a low absorptive capacity. The analysis has also identified that vital competences are lacking in current teaching. These are the awareness of EA being an interdisciplinary process and integrative and systems thinking. This despite, the ability to synthesize information from different sources to develop a holistic understanding is central to EA practise.

The comparison with the design dimensions for NL experiences shows a clear correlation with the category pedagogy of the IAIA Principles an indirect correlation with content and skills. The social dimension in NL is not visible in the analysed course syllabuses, and notions of conflict management and reflective practice are weak.

The backbone of EA teaching is the same in all countries and there are good opportunities, with technology, to build international teaching networks. This would enable more knowledge sharing in larger teaching communities in the field of EA teaching. Therefore, network learning offers a potential for EA teaching, bridging the gap between theory and practice.

Keywords

Environmental Assessment, Networked learning, Knowledge and learning.

Introduction

Environmental Assessment (EA), including Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (SEA), is a forward-looking process of identifying the potential advantages and disadvantages of a proposed action thereby assisting decision-makers (IAIA, 2009; Partidário, 2012). EA is mainly applied in physical landuse planning and for the approval of projects (e.g. road, rail, energy transmission) and various permits (e.g. water works, factory operations). EA has a dual nature, each with its own methodological approaches (IAIA, 2009):

- an analysis of the consequences of a planned intervention (policy, plan, program, project), providing information to stake-holders and decision makers; or unplanned events, such as natural disasters, war and conflicts.
- a legal and institutional procedure linked to the decision-making process of a planned intervention.

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The first regulation on EA came through the Natural Environmental Protection Act in the USA in 1970 (UN Environment, 2018). Since then, most countries in the world have adopted legislation on EA (Wood, 2003). EU adopted a Directive on EIA in 1995 and a second Directive on SEA in 2004. Sweden introduced formal requirements on EIA during the 1990s and SEA in 2004 (Faith-Ell, 2015). Since then, the EU Directive on EIA has been amended several times as well as the Swedish legislation. In the last amendment in 2017 a requirement on the competence of the EIA practitioner was introduced in order to improve the quality of EIA (Marmefeldt, 2016).

Kågström (2016) and Balfors et al. (2018) show that the issue of EA practice not achieving best practice has been an issue within EA research for a long period of time. At the same time, the dual nature of EA means that the competence requirements on EA practitioners are very high. They are expected to have a general understanding of a variety of environmental aspects as well as technical details of e.g. road engineering of agriculture, leadership skills, communication skills when it comes to public consultation, and EA theory and legislation. Kågström (2016) shows in her research that an important group of practitioners in the performance of EA is consultants. Furthermore, the quality performance was strongly influenced by practitioners' perceptions of appropriate action (Kågström, 2016). This is supported by other studies that EA practice and implementation is influenced by interrelations (Kørnøv and Thissen, 2000), norms (Blicharska et al., 2011) and subjective informed judgements (Ehrlich and Ross, 2015) of the actors involved and their use of discretion (Kørnøv et al., 2014). However other important groups influencing the performance of EA are County Administrative Boards, Municipalities and proponents (Isaksson et al. 2009). The variety of skills and parties involved in EA has led to a wish among Swedish EA practitioners for an arena for reflection of their own practice (Balfors et al., 2018). Furthermore, following recent court verdicts, concerns have been raised, in the Swedish debate on EA quality regarding the competence weaknesses among Swedish EA practitioners. Examples of court cases are the rejections by the Environmental Court for i) the extension of a calcite quarry at Slite (the so called 'Cementa case') (Mark- och miljööverdomstolen, 2021), and ii) the extension of the Kirunavaara mine (Mark- och miljödomstolen, 2021). Both cases were rejected due to basic omissions in the court applications.

All this together, have led to a situation in which various players have brought forward the need for arenas where practitioners can meet and learn outside of the framework of their regular professional roles. Lifelong learning covers the whole range of learning that includes: formal, informal and non-formal learning. Lifelong learning in the sense of professionals returning to organised learning has been described as a process that includes people learning in different contexts. The issue of teaching and learning has been discussed within the field of EA since the introduction of NEPA (Morrison-Saunders et al. 2020). However, compared to other professional fields it is underexplored (Sanchez & Morrison Saunders 2010; Morrison-Saunders et al. 2020). EA is a member of the larger family of impact assessments, and in the year 2018 the International Association for Impact Assessment (IAIA) published Best Practice Principles for Impact Assessment Teaching and Training (Pope & Morrison-Saunders 2018; Morrison-Saunders et al. 2020). The IAIA Principles builds on three main categories representing different dimensions of teaching impact assessment; content, skills, and pedagogy (see Table 1 below).

Both the pedagogical traditions in the Swedish EA community and the sustainability teaching at Mid Sweden University derives from a practical approach (Faith-Ell & Loungeville, 2021; Loungeville & Faith-Ell, 2021). Due to the societal need to move in a more sustainable direction has the aim at Mid Sweden University been to create a pedagogy that will foster independent and problem-solving students, since the early 1980s (Grönlund et al, 2021). The education has also been in a blended format for more than a decade and this practise is influenced by the community of inquiry (CoI) framework developed by Garrison, Anderson, and Archer (2000).

Network learning (NL) as research field and practice emphasis on collaborative learning and recognises the importance of human relationships and collaborative engagement in learning communities, as well as how technology shape human activity and are shaped by human activity (Networked Learning Editorial Collective, 2021). In Table 1 in Networked Learning Editorial Collective (2021), the part by Rodríguez-Illera and Barberà, presents and describes design dimensions for NL experiences are (see Table 2 below). There are several similarities between the research and practise of the EA community and NL, for example the processes of collaborative, co-operative and collective inquiry, that is vital in EA practise. The EA community therefore seems to have much to learn from NL when it comes to further improve practise concerning how to strengthen the capacity to work creatively in creating knowledge, collectively identify problems and the resources to develop solutions and in doing so, building trusting relationships, motivated by a sense of shared challenge. Given the current developments in society and the commitment to equity and social justice, NL is both in line

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with the ambitions of the EA community and the sustainability teaching traditions at Mid Sweden University. This has however not been explored or analysed before.

Aim

Mid-Sweden University has initiated the development of a course for EA practitioners in Sweden. One reason being that none of the previous two courses for practitioners are active. One of the tasks within the project has been to evaluate the current teaching within the field of EA in Sweden. The aim of this paper is thus to explore and analyse the current EA teaching in Sweden in order to develop this field through influence from other disciplines, in this case Network Learning. The paper builds on the following research questions: i) How well does EA curriculums at Swedish Universities correlate with the IAIA Best Practice Principles for teaching and training? How do the IAIA Principles stand with regards to other principles i.e. the Design dimensions for Network learning experiences?

Method

The paper builds on two different analyses. The first being an analysis of EA courses in Sweden. The second being a comparison of the IAIA Principles and the Design dimensions for Network learning experiences by Rodríguez-Illera and Barberà (2021).

The data for the analysis of the EA courses consisted of course syllabuses collected from the websites of the different universities, minutes from the recently started Swedish network of EA teachers as well as field notes from the meetings with the group during 2021. In all, 22 courses were identified. Of these, the course syllabuses of 19 courses were analysed. The reason for excluding five courses were lack of information on the websites (three cases). The analytical framework used for the analysis was based on the IAIA Best practice principles (Morrison-Saunders et al 2020) (Table 1).

The second analysis was a qualitative comparative analysis of the IAIA Principles with the Design dimensions for Network learning experiences by Rodríguez-Illera and Barberà (Networked Learning Editorial Collective et al., 2021) (Table 2). The aim of the analysis was to identify potential correlations between the two sets of criteria. The visualisation of correlations was made through the application of Sankey diagrams. Sankey diagrams are normally used in order to visualise flows e.g. energy (c.f. Schmidt 2008). However, in this paper the Sankey diagrams have been applied with the intent to visualise correlations.

Table 1: Categories of Best practice teaching of impact assessment (Pope & Morrison-Saunders 2018; Morrison-Saunders et al. 2020).

Content	Pedagogy	Skills
(1.1) Integrates the theory and practice of impact assessment *Practical aspects are discussed with emerging research in the field.*	**(2.1) Is tailored to the context, needs, and capacities of learners** *The requirements of learners are ascertained in advance and the course is designed to meet these.*	**(3.1) Integrative and systems thinking** *The ability to synthesize information from different sources to develop a holistic understanding.*
(1.2) Incorporates research contributions *Learners engage with emerging research in the field.*	**(2.2) Is flexible** *Teachers/trainers adapt to the emerging requirements of learners as the course progresses.*	**(3.2) Critical thinking** *The ability to make reasoned arguments based upon critical evaluation of information.*
(1.3) Presents international best practice principles *Learners are aware of what constitutes international best practice, regardless of the specifics of the impact assessment systems within which they operate.*	**(2.3) Facilitates co-learning** *The knowledge and experience of the learners is drawn upon to complement those of the teacher/trainer.*	**(3.3) Judgement** *The ability to make decisions in situations of uncertainty, incomplete information, and competing values.*
(1.4) Presents the requirements of specific standards, regulations, or procedures relevant to the participants *Learners are familiar with the specifics of the impact assessment systems within which they operate.*	**(2.4) Simulates key features of impact assessment practice** *Pedagogy incorporates features such as teamwork, communication, transparency, accountability, peer review.*	**(3.4) Written communication skills** *The ability to prepare written materials in a clear and logical way that is comprehensible to non-experts.*
(1.5) Explores professional ethics	**(2.5) Provides opportunities for discussion and debate**	**(3.5) Oral communication skills**

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Learners are prepared to face ethical dilemmas and are aware of expected professional standards.	*Learners are encouraged to participate, challenge, and share views.*	*The ability to engage in meaningful two-way communication with a variety of different stakeholders.*
(1.6) Positions EIA as an interdisciplinary process *Learners are aware that impact assessment integrates different forms of knowledge.*	**(2.6) Utilizes case studies** *Actual or hypothetical examples of impact assessment practice are provided to illustrate concepts and as the basis for practical exercises.*	**(3.6) Collaboration and teamwork skills** *The ability to work in diverse, interdisciplinary teams.*
(1.7) Presents impact assessment as a pluralistic process *Learners are aware that impact assessment engages with multiple stakeholders with different values and perspectives.*	**(2.7) Provides opportunities to gain practical experience** *Activities reflect the realities and complexities of impact assessment practice.*	**(3.7) Project management and coordination skills** *The ability to manage a team and complex tasks to achieve a defined goal.*
(1.8) Presents impact assessment as being both socio-political and technical in nature *Learners are aware that impact assessment is both an art and a science.*	**(2.8) Facilitates self-learning** *Learners are encouraged to apply concepts to their own contexts and to reflect on their personal learning processes.*	**(3.8) Research skills** *The ability to formulate, conduct, and report on research.*
(1.9) Fosters sustainability-oriented norms and values *Learners are prepared to be advocates for the environment and sustain-ability.*	**(2.9) Is memorable and fun** *An enjoyable learning environment is created.*	**(3.9) Job readiness** *The practical skills required to coordinate an impact assessment in a professional setting.*
(1.10) Provides practical methods and tools *Learners leave the course with a 'tool kit' they can apply in future work.*		

Table 2: Design dimensions for NL experiences (Rodríguez-Illera and Barberà (Networked Learning Editorial Collective et al., 2021). (N.B. The letters signifying the NL dimensions have been added by the authors in order to simplify the Sankey analysis).

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A. Facilitation	*To what extent were there facilitators working directly with learners?*
B. Openness	*To what extent was the learning experience open to any participants outside an institution, and were materials openly accessible?*
C. Structure	*To what extent was there structure that was planned and followed?*
D. Voluntariness (related to structure)	*To what extent was participation of learners' voluntary versus part of something mandatory*
E. Linearity (related to structure)	*To what extent does the learning experience flow in a particular order?*
F. Certification	*Was there certification at the end for completion? How formal is this certification (e.g. accredited, assessed, informal?)*
G. 'Eventiness'	*To what extent are there clear deadlines and timed commitments?*
H. Content vs process	*To what extent is the learning experience designed around content/learning outcomes vs process goals? (Smith 2018)*
I. Homogeneous learning path versus autonomous pathways	*Is there just one pathway or multiple? (see Crosslin 2018)*
J. Playfulness	*To what extent were 'fun'/elements of play used?*
K. Collaboration	*To what extent is collaboration built into the design of the learning experience?*
L. Affective	*To what extent is the affective dimension of NL encouraged, emphasised, recognised or centred?*
M. Socially just economically	*To what extent is the networked design emphasizing economic social justice principles, using tools and technologies accessible to a broad range of target learners with different infrastructure supports?*

N. Socially just culturally	*To what extent is the networked design emphasizing cultural social justice principles? Is there representation from diverse and especially marginalised cultures?*
O. Socially just politically	*To what extent is the networked design emphasizing political social justice principles? Are there diverse learners/teachers involved in the design of the learning experience? How much power do they have in decision-making 'parity of participation'? (Fraser 2005)*

Results

The analysis shows that there are 12 courses solely dedicated to EA and in nine courses where EA included as a part of the course. Most (17) courses are on campus, two courses are online and two in blended format.
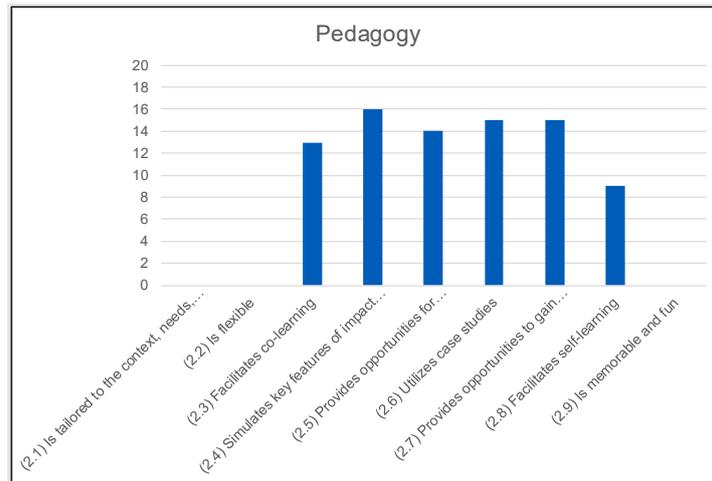
Content

Figure 1 shows the result of the analysis of the course syllabuses with regards to the category 'Content' in the IAIA Principles. The analysis shows that the majority of the courses focus on both theory and practice of EA (1.1). The principle 'Requirements of specific standards, regulations, or procedures relevant to the participants' (1.4) is also central in the majority of the courses. Also, 'Fosters sustainability-oriented norms and values' (1.9) and 'Provides practical methods and tools' (1.10) are common in the syllabuses. Principles that are not that common in the syllabuses are 'Incorporates research contributions' (1.2), 'Presents international best practice principles' (1.3), 'Explores professional ethics' (1.5) and 'Positions EIA as an interdisciplinary process' (1.6).
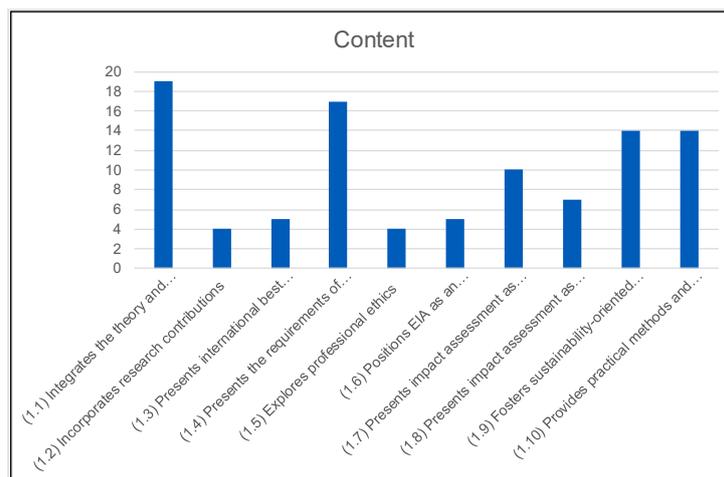
Figure 1: Result of the analysis of EA syllabuses at Swedish universities with regards to the category Content in IAIA Best Practice principles.

Pedagogy

Figure 2 shows the result of the analysis of the syllabuses with regards to the category 'Pedagogy' in IAIA Principles. Principles 2.1, 2.2 and 2.9 could not be found in the syllabuses. The weakest principle apart from these three was 'Facilitate self-learning' (2.8). The other principles in the category are found in most of the studied syllabuses. Furthermore, it is clear that the EA courses are based on teamwork and case studies and focus on the practical execution of EIA.

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Figure 2: Result of the analysis of EA syllabuses at Swedish universities with regards to the category Pedagogy in IAIA Best Practice principles.

Skills

Figure 3 shows the result of the analysis of the EA syllabuses with regards to the category 'Skills' in IAIA Principles. The analysis shows that five principles are well represented in the syllabuses. These all categories represent basic skills that are taught at all university educations in Sweden and is not unique for the field of EA. The skills that are more EA specific are not taught to any extent according to the syllabuses.
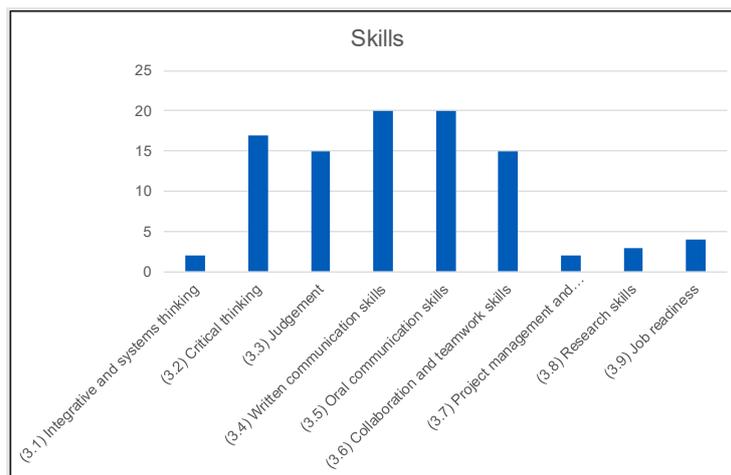
Figure 3: Result of the analysis of EA syllabuses at Swedish universities with regards to the category Skills in IAIA Best Practice principles.
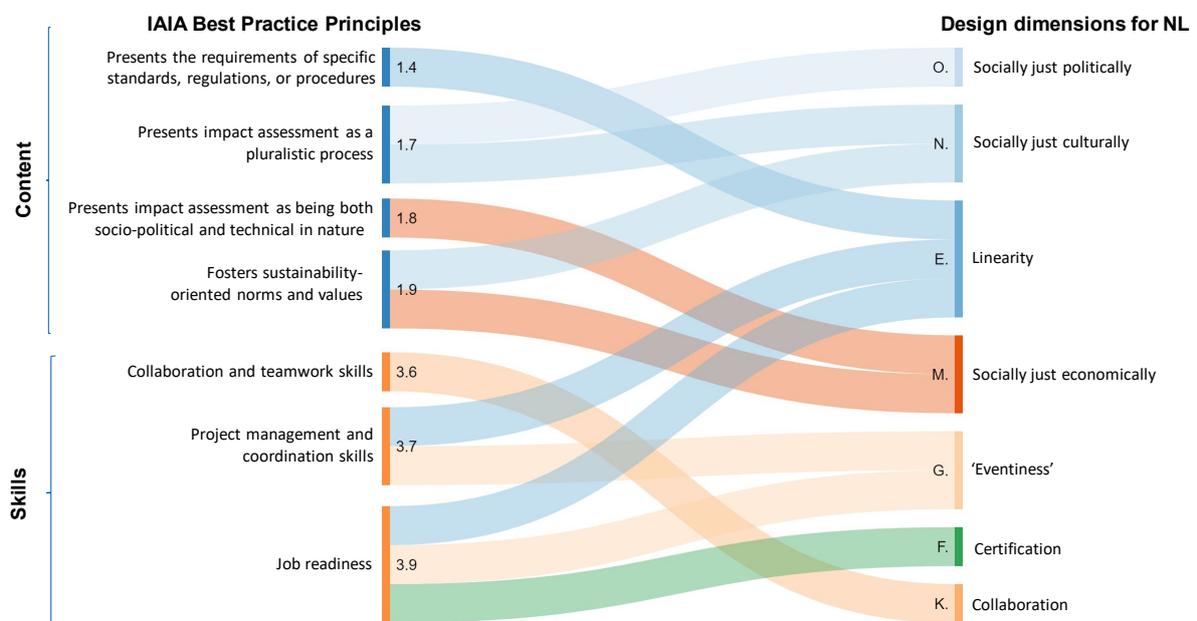
Comparison

The comparison of the IAIA Principles and the Design dimensions for NL experiences shows that there is a direct correlation between the IAIA category Pedagogy and about 50 percent of the NL Design dimensions (Figure 4). All but one principle (2.8) in the category Pedagogy correlates to one or more NL Design dimensions.

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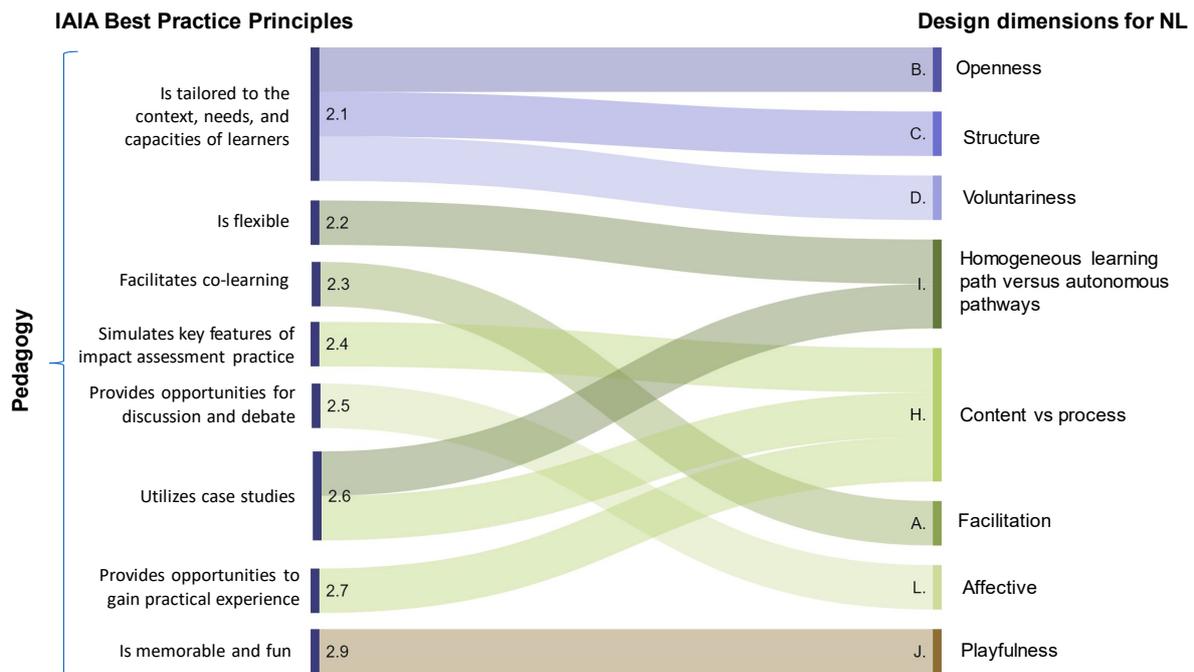
Figure 4: Direct correlations in the comparison of IAIA Best Practice Principles and the Design dimensions for NL. (N.B. The letters signifying the NL dimensions have been added by the authors in order to simplify the Sankey analysis).

The other 50 percent of the NL Design dimensions correlate indirectly to some of the IAIA principles in the categories Content and Skills (Figure 5). By indirectly, we mean that these NL Design dimensions could not be found explicit in the IAIA principles for Pedagogy but could be found in the two other categories. Still, more than half of the principles of the IAIA categories Content and Skills respectively do not correlate to any of the NL Design dimensions.

Figure 5: In-direct correlations in the comparison of IAIA Best Practice Principles and the Design dimensions for NL. (N.B. The letters signifying the NL dimensions have been added by the authors in order to simplify the Sankey analysis).

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Discussion

Impact assessment at Swedish Universities

The analysis shows that there are no candidate or master programmes in Sweden solely aiming at EA. Instead, the students gain knowledge in EA through individual courses or as a part of broader courses aiming at various tools within the field of environmental science. I.e. it is the pedagogical layout of the entire programmes that forms the students. This result corresponds to the experiences of teaching EA in Canada (Stelmack et al. 2005) and Portugal (Ramos et al. 2008). Furthermore, the result emphasises the importance of the teachers of EA courses being a crucial part of the planning and development of the programmes. Something that the members of the Swedish EA teacher network are well aware of, however with varying possibilities to influence.

Generally, the dual nature of EA being both a process for analysis of the consequences of a planned intervention, and a legal and institutional procedure linked to the decision-making process is reflected in the syllabuses. It is clear that the courses are mixing theory and practice. At the same time, the analysis shows that most of the courses are leaning more towards practical training than integration of research contribution and research training. One possible explanation for this is that there is very little research in EA at the majority or the universities that teach EA. In reality, the majority of the EA research is carried out at three universities in the country. This can also be seen in the results where the course syllabuses from these three universities are the ones that state that research results are incorporated in the teaching (Figure 2). Weaknesses in EA research experience among EA teachers correspond to the situation in Spain (Enríquez-de-Salamanca, 2019). A second explanation could be that when EA was introduced in Sweden, it was first taught at departments with a traditionally had a very strong focus on practical applications e.g. engineering and law.

The lack of integration of research results is interesting from the perspective that the practice constantly changes due to new insights from research but also due to changes in society including the EU legislation. EA as a research field but also practical field have changed considerably since its introduction in the early 70-ies. This means that there is a risk that the students will leave the university with a low absorptive capacity.

The principles 'Is tailored to the context, needs, and capacities of learners' (2.1) (also emphasising the need identified above of close collaboration between EA courses and full programmes), 'Is flexible' (2.2) and 'Is memorable and fun' (2.9) could not be found in the syllabuses. However, this is usually not something that would naturally be a part of a syllabus. Therefore, it should not be considered as a shortcoming. In order to get a valid answer to the incorporation of these principles other methods would be needed for example analysis of course evaluations. Also, for the other principles course evaluation analysis and interviews would bring a richer understanding of the state of the art of EA teaching in Sweden. This is something that should be explored further in the future.

Vital competences lacking in current teaching

The IAIA Principles indicates, for each principle, if it is very important or extremely important for teaching and/or training. Most of the principles that are considered extremely important for teaching are covered in the EA teaching at Swedish universities. However, the analysis shows two areas that are lacking in current teaching at almost all studied universities are: i) research: 'Incorporates research contributions' (1.2) and 'Research skills' (3.8), and ii) the complexity of this field: 'Positions EIA as an interdisciplinary process' (1.6) and 'Integrative and systems thinking' (3.1). The incorporation of emerging research in the field and the awareness of EA and the ability to synthesize information from different sources to develop a holistic understanding is central to EA practise, including its effectiveness (c.f. Geißler et al., 2019). However, this also requires deep knowledge by those who teach in the courses. Considering the limited research in EA carried out at the majority of the universities that teach EA, this could affect the potential for achieving best practice EA in Sweden. Furthermore, the two areas, research and complexity are closely related to the concept competent EIA expert required by EU. In many of the EU member states, the concept competent expert has been defined according to national standards (Marmefeldt, 2016). However, this has not been done in the case of Sweden. The analysis supports previous results (Balfors et al. 2018), that there is a need for arenas for learning. Both within university programmes and for practitioners.

Ethics is another theme (1.5) not covered by most courses. It might be partly covered by the principle 'Judgement' (3.3) but the ethical aspects require more than to deal with uncertainty, incomplete information, and competing values. In current Swedish legislation, there are no requirements of the EA practitioner being independent from the proponent. However, research has shown that e.g. consultants can be put under pressure to

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revise their conclusions of the EIA (Kågström 2016). Therefore, it is crucial that students are trained to uphold a high integrity in their profession. This can be done by a reflective practice throughout the education.

Potential for networked learning in EA teaching

The analysis of the syllabuses could be seen as a benchmark study against a standard reflecting the current state of teaching EA internationally. This poses a weakness to the study since the standard of the IAIA could be low compared to teaching in other fields. Therefore, a comparison with the design dimensions for NL experiences were carried out in order to relate the IAIA Principles to another categorisation, and potentially get insights for improvements. The comparison shows a clear correlation with the category Pedagogy of the IAIA Principles but also indirect correlation with Content and Skills. Based on this one could argue that the IAIA Principles could serve as a basis for analysis of EA courses. At the same time, both the design dimensions for NL experiences and the IAIA Principles are based on the current situation rather than where the standards of the two fields should to be in the future.

Networked learning focuses on cooperation and interactions between people, ideas and solutions (Networked Learning Editorial Collective, 2021). If applied on the field of EA teaching, this offers both an analytical framework and an area for inspiration when in developing EA teaching. The social dimension in NL is not visible in the analysed course syllabuses, but a few universities bring in practitioners as lecturers in their courses, mix students from different programmes, or engage in activities such as role play.

Another topic that could be further explored based on the NL design dimensions are the potential of Swedish and International EA teaching. Due to the common starting point of EA, the backbone of EA teaching is the same in all countries in the world and there are good opportunities, with technology, to build international teaching networks. This would enable more knowledge sharing in larger EA teaching communities. Here, NL offers a vast knowledge that is valuable for the EA community. Some areas of interest are design and models for lifelong learning, how to build technical support in large learning communities where participants bring their own data and much more.

In this analysis we have also identified two new themes that are not described in the IAIA Principles. These are 'Conflict management' and, 'A reflective practise including adaptive and agile management' meaning the capacity to re-evaluate the situation based on both new knowledge and information as well as for example arising conflicts. These two categories could only be found in three courses at two different universities. This means that we need to adopt the pedagogical practise in order to enable these knowledge and skills. Teaching EA through reflective practice might be the way forward to further develop this area.

Conclusion

This paper has explored the current teaching of EA in Sweden. The analysis shows that there is a focus on practice rather than theory in the studied course syllabus. Furthermore, vital competences are lacking in current teaching, such as interdisciplinary systems thinking and research knowledge. The backbone of EA teaching is the same in all countries and there are good opportunities, with technology, to build international teaching networks. This would enable more knowledge sharing in larger teaching communities in the field of EA teaching. Therefore, network learning offers a potential for EA teaching, bridging the gap between theory and practice by focusing on reflective practice and strengthened national and international collaboration.

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Proceedings for the Thirteenth International Conference on Networked Learning 2022,