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### Publication date

2023

### Document Version

Final published version

### Published in

5th PLATE Conference Espoo, Finland. Proceedings

### Citation (APA)

Fromberg, E. H. E., Bakker, C. A., Entsminger, J., Grantham, C., Lusby, A., Peck, D., & Webster, K. (2023). Circular economy through the lens of the forest metaphor – a teaching and learning perspective. In K. Niinimäki, & K. Cura (Eds.), *5th PLATE Conference Espoo, Finland. Proceedings* (pp. 332-339). Aalto University.

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# PROCEEDINGS

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**Aalto University publication series**

ART + DESIGN + ARCHITECTURE 3 / 2023  
ISBN 978-952-64-1367-9 (electronic)  
ISSN 1799-4861 (electronic)



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Images: Jere Aalto / Aalto University  
Layout: Oona Rouhiainen

## Circular economy through the lens of the forest metaphor – a teaching and learning perspective

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**Keywords:** Circular economy; Teaching; Conceptual metaphor theory; Nonlinear metaphor.

### Abstract:

The idea of a circular economy promises radically different outcomes compared to the current, linear economy. To explore new lines of enquiry to achieve these different outcomes, metaphors can be used to allow a learner to think about a circular economy differently compared to the current economy. Conceptual metaphors are especially powerful for this purpose since they influence most abstract patterns of thought, and they have systemic properties. Therefore, this research describes an intrinsic case study about the engagement of a group of students with the metaphor of a forest during a two-day postgraduate-level course. This research addresses the question: *“to what extent does the forest metaphor allow students to rethink the relationship between businesses in a circular economy?”* Through this intrinsic case study, the insights, experiences, and perspectives of the students are analysed, after they have interacted with the metaphor of a forest.

### Introduction

The “circular economy” is an antonym for the linear economy, referring to the conventional economy which is characterised by extraction and degeneration. The circular economy promises radically different outcomes (Bocken et al., 2016; Murray et al., 2017; Geissdoerfer et al., 2017; Temesgen et al., 2021). However, some reductionist habits of thought from the linear economy, have influenced circular economy thinking (Fromberg et al., 2022; Murray et al., 2017).

Reductionist metaphors, such as the machine metaphor, tend to make sense of the economy as an entity that is removed and protected from society and the environment (Mutari, 2018). This causes the focus to be on tangible and measurable factors (such as products, emissions, and materials) instead of more social or dimensions, such as wider systemic change, which is more challenging to quantify.

To explore that an alternative conceptualisation may look like, this paper will explore what happens when postgraduate students engage with holistic metaphors with nonlinear qualities.

A nonlinear metaphor that is receiving attention within the context of a circular economy is the forest metaphor. Therefore, in this case study, the “source domain” (meaning the domain where insights are derived from) is the forest metaphor. The “target domain”, which is an abstract phenomenon that one tries to make sense of, is the idea of a circular economy.

Using the forest metaphor to make sense of a circular economy has the potential to provide more nuance compared to the currently dominant competitive metaphors, such as the sports metaphor and the war metaphor (Fromberg, 2022). Expected insights that may be derived from this source domain will be around the symbiotic relationships, the interdependency between different entities in the forest and the communication that happens through the mycelium networks. All these features exist in parallel to the competition for potentially scarce resources such as nutrients and sunlight.

This paper outlines the results of a case study where students explored relationships between businesses in a circular economy through the

forest metaphor. It addresses the research question: *“to what extent does the forest metaphor allow students to rethink the relationship between businesses in a circular economy?”* The paper describes the case of a two-day, workshop-style course on systems thinking, as part of the Postgraduate Diploma in Sustainable Business at the University of Cambridge Institute for Sustainability Leadership. During this course, 36 students actively engaged with the forest metaphor to understand relationships between businesses within a circular economy. The students signed up for the study, the participants, completed an experiential learning worksheet and a survey before the course started and completed a survey after the course ended.

## Background

Although metaphors are often seen in literature as individual linguistic expressions, or as the decoration of language, a more profound interpretation based on cognitive science reveals that metaphors are key to the conceptualisation of abstract ideas. Around 98% of an individual's reasoning is unconscious, requires emotion and uses the “logic” of conceptual metaphors (Lakoff, 2010). Most individuals are unaware of the metaphors that govern their thoughts and the extent to which those metaphors can influence the product of those thoughts (Lakoff, 2010). Engaging with new metaphors may allow individuals to come up with novel ideas or value already-existing ideas differently (Saffer, 2005) or explore new lines of enquiry (Strike & Posner, 1982).

Current mainstream circular economy discourse uses mostly sports and war metaphors to understand the nature of the relationships between businesses in a circular economy (Fromberg et al., 2022). However, this creates a clear tension with at least principle 8 of a regenerative economy as described by Fath et al., 2019:

- 1) Maintain robust, cross-scale circulation of critical flows including energy, information, resources, and money.
- 2) Regenerative re-investment.
- 3) Maintain reliable inputs & (4) healthy outputs.
- 5) Maintain a healthy balance and integration of small, medium, and large organisations.

- 6) Maintain a healthy balance of resilience and efficiency.
- 7) Maintain sufficient diversity.
- 8) Promote mutually beneficial relationships and common-cause values.
- 9) Promote constructive activity and limit overly extractive and speculative processes.
- 10) Promote effective, adaptive, collective learning.

The forest metaphor could have potential to provide insights beyond the promotion of mutually beneficial relationship and common-cause values. However, the designed learning experience of this case study will focus on conceptual development related to principle 8 in specific.

The two-day course was aimed at the development and accommodation of the conceptualisation that follows the logic of the forest metaphor. To ensure that a new conception is accommodated by the learner, the following conditions are to be met (Strike & Posner, 1982):

- There must be dissatisfaction with existing conceptions.
- A new conception must be intelligible.
- A new conception must appear initially plausible.
- A new conception should be fruitful.

This research will evaluate these conditions in the context of the forest metaphor in circular economy learning.

## Methodology

A qualitative methodology is most appropriate for exploring complex issues (Creswell & Poth, 2016) such as the interaction with conceptual metaphors by students. More specifically, the research is conducted through the methodology of an intrinsic case study. Through an intrinsic case study, an unusual or unique situation is presented (Stake, 1995). The case study in question will be the engagement with the forest metaphor during a two-day Sustainability Leadership Laboratory on *Systems Thinking*, organised by the University of Cambridge Institute for Sustainability.

This course took place on 27 and 28 February 2023 in Cambridge, United Kingdom and is part of the Postgraduate Diploma in Sustainable Business (a part-time, level 7 course). The

course is not compulsory. As such, all students self-selected for participation in this course.

On the first morning of the course, lectures were presented on systems thinking and systemic problems in the context of the economy, and a reflection on the difference between systemic transitions and transformations was provided. The afternoon programme started with a lecture about metaphors and an elaboration of the learning design of the 2.5-hour workshop that followed. This 2.5-hour workshop allowed the students to engage actively with conceptualisation of a forest for a circular economy and this is the scope of this research. A second day of systems thinking content that followed this workshop is considered out of scope for this research.

#### *Participant selection*

All students on the course have been invited to join this study. The course requirements are a minimum of 3 years of relevant work experience; however, most students will be mid-to-senior managers from a variety of sectors, industries, and geographies. Of the 36 students joining the course, 30 signed up to be participants in this study and filled in the consent form. Eventually, 27 participants filled in the first survey and completed the two days of the course. Of these 27 participants, 20 also completed the post-workshop survey.

#### *Data collection*

The study draws from three points of data: two surveys and the pre-course preparation worksheet. The first survey was sent over after signing up to the research and this was followed by an invitation to complete the pre-course worksheet. During the pre-course worksheet, the students were asked to go to a forest to activate the metaphor. The worksheet asked them to capture thoughts on how and when nature inspired them as well as to observe how different entities in the forest interact with each other. The second survey was sent to the participants after the workshop.

#### *Data analysis*

The qualitative data was analysed according to grounded theory (Bryant et al., 2007). All responses were coded and clustered.

For example, when participants were asked what insights from the forest metaphor were realistic to implement, one of the clusters was

defined as “interconnectivity” based on the coding of the following answers:

- *“We need to understand that all elements of an organisation are connected, like the roots of the trees and the fungi networks, and therefore look at the system as a whole.”*
- *“More thoughtful cooperation inside the organisation to reveal the potential of each employee and design interconnections internally.”*
- *“The forest metaphor was helpful to consider the inter-connectedness of organisations and institution”*

## **Results**

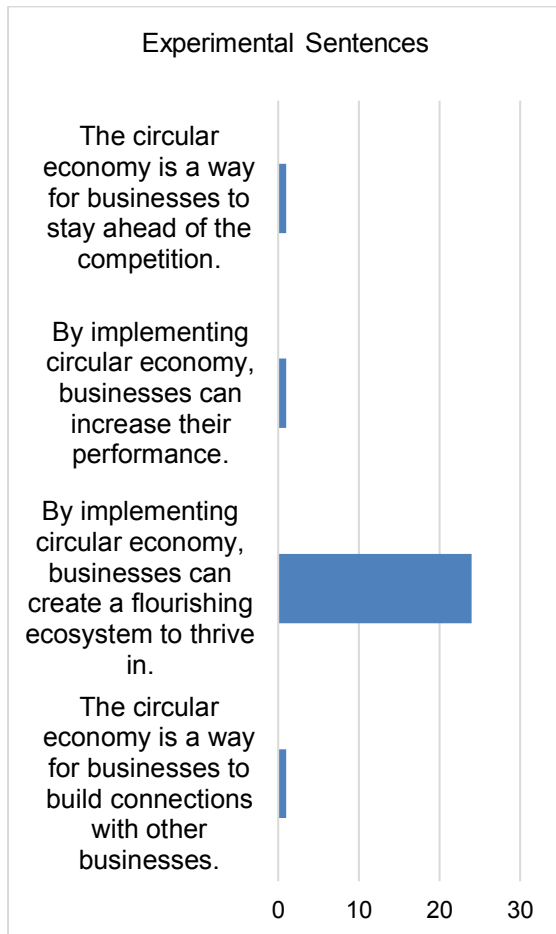
### *Participants*

Most of the students were taking the course as part of their part-time studies. Participants declared to be in their 20s (4), 30s (7), 40s (9), 50s (6) and 60s (1). All participants were in employment during the time of the study. 14 out of the 27 participants work in “business”, followed up by “policy” (3), “advisory” (3), “NGOs” (2), “academia and research” (2), “education” (2) and “finance” (1). When asked to self-assess their competencies related to the “circular economy” the participant’s responses ranged mostly from moderately competent to competent.

### *Initial circular economy conceptualisation*

In the first survey, the participants were asked to choose between four experimental sentences that demonstrated two competitive metaphors and two forest metaphors. 24 students found that the following sentence resonated most with them: “By implementing circular economy, businesses can create a flourishing ecosystem to thrive in.” as demonstrated in Figure 1.

25 Out of 27 participants were to some degree comfortable with a conceptualisation that follows the logic of the forest metaphor.



**Figure 1. Overview of the selection of the experimental sentences by the participants.**

When asked to elaborate on why they chose this sentence, participants mentioned alignment with their personal views, because they view businesses as part of an ecology, and because it refers to the conditions for life as a starting point for thinking about the economy.

Only two participants selected an experimental sentence that displayed a competitive metaphor. The main reason for their choice is that they believe business needs to act sustainably to ensure that they can stay ahead of the competition and increase their performance.

After the selection of the experimental sentences above, the participants were asked if they thought most individuals in their organisation would agree with them. 11 Participants expect they would, and 16 participants were either unsure or did not

expect they would agree with them. The main reason why participants were unsure about the stance of other individuals in the organisation is due to a lack of knowledge, interest, or awareness about the circular economy. The second reason was that they expect that others would value competitive features more and prefer the most profitable way possible.

### *Metaphor activation*

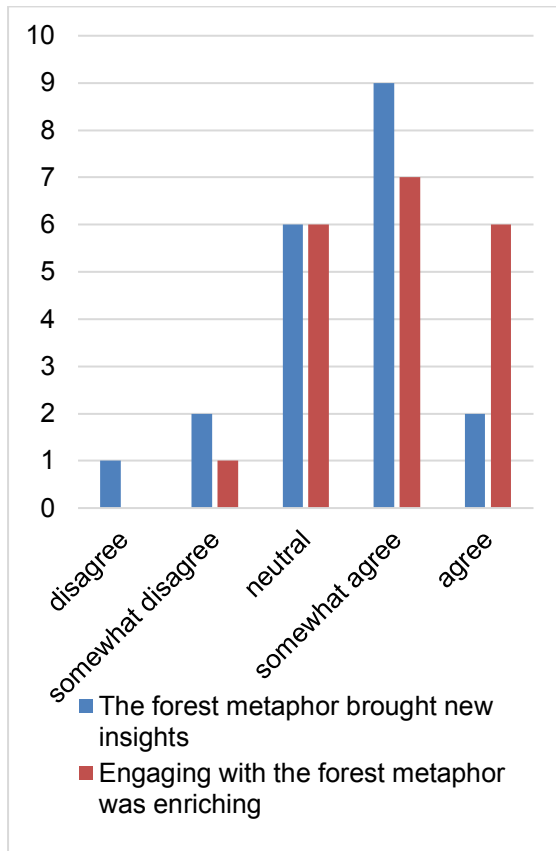
Before the course officially started, the participants were asked to venture into a forest and complete an experiential learning worksheet. Most participants confirmed that they were able to complete this exercise, but some experienced challenges accessing an ecosystem such as a forest when residing in an urban area.

The purpose of this element of the course was to activate their present knowledge about the forest, which helps them prepare for the workshop during the course. During this exercise, features were prompted around interdependency, connectivity, resilience, and symbiosis.

### *Workshop experience*

After the workshop, most participants agreed or somewhat agreed that engaging with the forest metaphor had been enriching and brought new insights. The graph in Figure 2 shows that participants agreed that the metaphor has been enriching. However, this response was less strong for the insights that this metaphor brought to them.

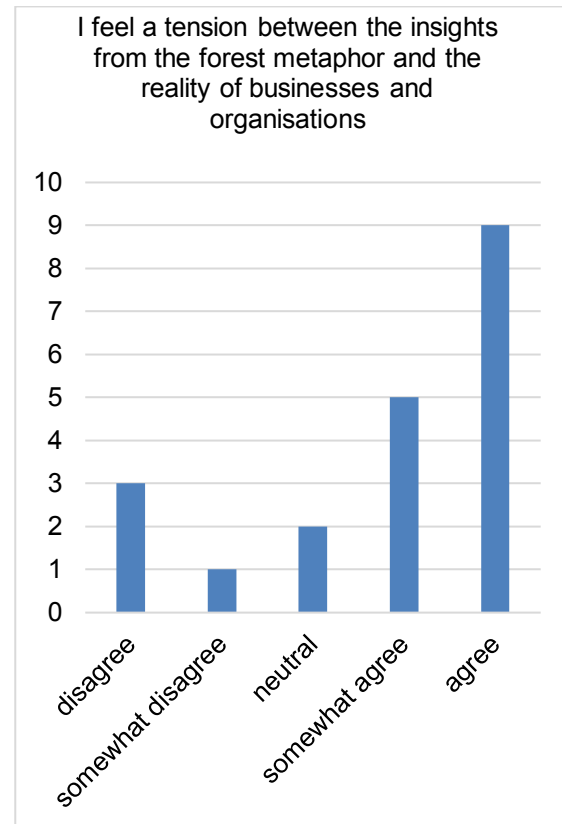




**Figure 2. A comparison of the result of the statements: “the forest metaphor brought new insights” and “engaging with the forest metaphor was enriching”.**

When participants were asked to elaborate on this, qualities like the interconnectedness of organisations and institutions were mentioned most frequently together with cooperation between different entities in the economy.

At the same time, most participants also felt tension between the insights of the forest metaphor and the reality of their business or organisation as indicated in Figure 3.



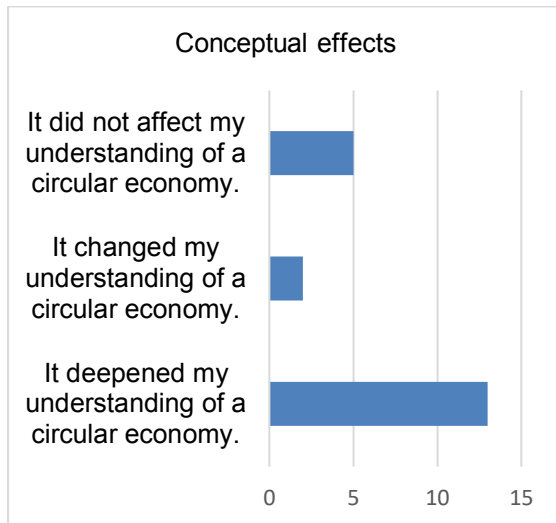
**Figure 3. There was a tension identified between the forest metaphor and the reality of businesses and organisations.**

### *Conceptual development*

In the second survey, the experimental sentences were presented to the participants again and as expected, a similar outcome was generated to the pre-course survey.

In a later question, as visualised in Figure 4, the participants expressed that they either found their understanding or conceptualisation of a circular economy unaffected or deepened.





**Figure 4. The conceptual effects of the learning experience.**

### Features of the forest metaphor

Finally, the participants were asked to review the principles of a regenerative economy (Fath et al., 2019) and rate how relevant they find the forest metaphor for this principle.

The forest metaphor has been rated between somewhat relevant and very relevant for all principles by the participants. This indicates that there could be a shared understanding of the forest metaphor that would be in line with the idea of a regenerative economy.

### Discussion

Insights from the forest metaphor that stood out to the participants were mostly around the interconnectedness of organisations and institutions as well as cooperation between different entities in the economy. However, the participants of this study seem to face challenges applying the insights of the forest metaphor and most indicate a tension between the insights of the forest metaphor and the reality of their organisation.

To evaluate the nature of this so-called reluctance to accommodation, the four conditions for conceptual change from Strike and Posner (1982) are evaluated considering the engagement with the forest metaphor.

#### Condition one and two

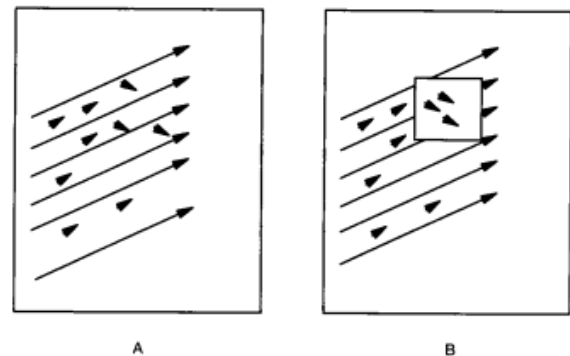
The dissatisfaction with existing conceptions and the condition that the new conception must be intelligible are assumed to be met when the students signed up to the course since the sign-

up page had a clear descriptor of the learning activities that would take place.

#### Condition three

The third condition requires that a new conception must appear initially plausible. Posner & Strike (1982, p.235) mention that “a new idea [...] is less likely to be accepted if it is inconsistent with current [...] knowledge, or if it has no clear physical account”. In other words, there could be a reluctance in the acceptance of new conceptualisations if there is an inconsistency with other knowledge.

Cobern (1996) describes the phenomenon when learners isolate the concepts that do not fit their natural way of thinking (see Figure 5). After pressure is relieved, such as an exam or occasion where the new concept was fruitful, the conception deteriorates, and the learner reverts to their natural way of thinking. This is due to the pressure and orientating effect of the overall worldview.



**Figure 5. the orientating effect of worldview (Cobern, 1996).**

Insights from the forest metaphor could be conflicting with the participants' current conceptualisation of the relationship between businesses in a circular economy and lead this cognitive isolation. However, in the pre-course survey, it was identified that 25 out of 27 participants were comfortable to some degree comfortable with the logic of the forest metaphor. This could be further and more robustly investigated but it suggests that to some degree their worldview could accommodate and support more nonlinear metaphors, such as the forest metaphor.

#### Condition four

The fourth condition is that a new conception should be fruitful. As part of the fourth condition,

*“the new conception must do more than solve its predecessors’ difficulties. It should have the potential to be extended, to open up to new areas of inquiry.”* (Strike & Posner, 1982, p.235). The participants claim that the engagement with the forest metaphor enriched their understanding of circular approaches, however, most also felt a tension between the reality of their organisation and the insights of the forest metaphor.

This was especially expressed by participants that felt that the competitive nature of the company would always receive priority. During the workshop, participants raised how some of the insights seemed unrealistic to their specific context. One of the participants raised the recent cases where ESG - Environmental, Social, Governance - collaboration has been accused of violating anti-trust laws (O’Sullivan, 2023). Several others raised the importance of their shareholder responsibility would be a barrier to several of the features of the forest metaphor.

### **Pedagogical implications**

The fourth condition around the fruitfulness of the conceptualisation particularly requires attention from a teaching perspective, since participants raised challenges when applying the insights into their business context.

Strike and Posner (1982) suggest that the teacher should take the role as Socratic tutor. A traditional interpretation of Socratic practice leads to a situation where the teacher insists on consistency among beliefs and confronts learners with the implications of their thoughts through a dialogue. However, a more contemporary practice of a Socratic exchange is used as a teaching method for critical thinking (Boghossian, 2006).

In the case of the use of the forest metaphor to make sense of the relationship between businesses in a circular economy, this could mean that the teacher is part of an exchange with the learner to seek specific areas where their ideas could align with the reality of their business or organisation.

### **Conclusion**

This study aimed to evaluate to what extent the forest metaphor allows students to rethink the relationship between businesses in a circular economy. The forest metaphor was chosen due

to its features around balancing competition and interdependency, which could lend itself well to an alternative conceptualisation of businesses in a circular economy. The study was addressed through a case study of a course which attracted students that seemed comfortable with the logic of the forest metaphor.

The engagement with the forest metaphor in the context of the circular economy was considered enriching by the participants. It seemed relevant to the principles for a regenerative economy by Fath et al. (2019). Therefore, the initial insights that come with the forest metaphor could be considered a promising line of enquiry in the development of a conceptualisation of a circular economy inspired by a nonlinear metaphor.

However, most participants experienced tension between the insights of the forest metaphor and the reality of businesses and organisations. When asked about areas where they were able to implement insights from the forest metaphor, many were not able to identify clear areas within their business or organisation. This tension mostly affects the fruitfulness of the new conceptualisation and requires attention from a teaching perspective.

This could mean that more practical features from the source domain (the forest) could be proposed to the learner when engaging with this metaphor. Learning through a Socratic exchange may support in identifying more concrete areas for the application of this metaphor in a circular economy business context.

Further research could explore areas within the target domain of sustainable business where specific insights from the forest domain are fruitful and applicable.

### **Acknowledgements**

The authors would like to thank Ellen Mumford from the University of Cambridge Institute for Sustainability Leadership for her project management of the course.

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