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Moving Sustainability Forward:

A Game-based Approach For Building Confidence In Municipal Administration

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Table of Contents

Abstract.....	1
1 Introduction	2
1.1 The importance of municipal administrators	2
1.2 Transformative capacities and capacity building.....	4
1.3 Capacity building with game-based workshops.....	7
1.4 Research gap and research question	8
2 Methods.....	9
2.1 Case study	9
2.2 Game design.....	10
2.3 Data collection and analysis.....	11
3 Results.....	15
3.1 General observations	15
3.2 Collective successes and collective confidence	16
3.3 Breaking down ambitious tasks and overcoming small barriers	17
3.4 Acknowledging real-world actions in game	18
3.5 Summary of results	19
4 Discussion.....	19
4.1 Establishing a baseline	19
4.2 Collective successes and collective confidence	20
4.3 Breaking down ambitious tasks and overcoming small barriers	21
4.4 Acknowledging real-world actions in game	22
4.5 Overall reflections on the game-based workshop.....	23
5 Conclusions and outlook.....	24
References.....	26
Eidesstattliche Erklärung.....	31

Appendices (see attached CD):

- Appendix A: Game instructions „Stadt-liche Ziele“
- Appendix B: Game Material „Stadt-liche Ziele“
- Appendix C: Codebook
- Appendix D.1: Pre-Questionnaire
- Appendix D.2: Post-Questionnaire

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Leo Florian Reutter^{#§}

Abstract

Cities with a car-oriented mobility system are significant consumers of energy and require drastic transformations in their structure and function to minimize their harmful impacts on environment and people and to achieve sustainability goals. To promote such sustainable transformations, municipal administrators need to act as change-agents. Because municipal governments are often not agile organizations, they tend toward incrementalism even in the pursuit of transformational goals. Therefore, there is a need in municipal governments to build individual transformative capacity so that municipal administrators can design, test, and implement plans, projects, and policies that are capable of transforming cities toward sustainability. This research presents a game-based workshop, “Stadt-liche Ziele” (AudaCity), that uses a backcasting approach to make municipal administrators build a sustainability strategy. I conducted a pilot study to test the effects of the game on municipal administrators’ confidence in their own ability and power to implement sustainability actions, a key determinant of transformative capacity. Five municipal administrators from Lüneburg, Germany, working on mobility issues, participated in a three-hour-workshop playing the game. Interviews and questionnaires were used before and after the workshop and participants’ contributions during the event were recorded to explore collective changes in confidence. Results indicate that the game increased participant confidence by rewarding collective success, breaking down an ambitious goal into achievable tasks, and acknowledging how administrators’ current actions already contribute to the goal.

Keywords: transformative capacity, capacity building, confidence, self-efficacy, games, municipal administration, mobility, sustainability

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1 Introduction

To promote sustainability on the local level, municipal administrators need to act as change-agents, going far beyond a bureaucratic role (Keeler et al., in review A). Building their transformative capacity to implement sustainability transformations can improve their sustainability performance (Keeler et al., in review A; Wang et al., 2014). This paper's goal is to explore whether a game-based workshop playing "Stadt-liche Ziele"¹, a collaborative backcasting game, can be effective in building municipal administrators' confidence in their capacity to carry out sustainability actions.

1.1 The importance of municipal administrators

Cities are significant consumers of resources, producers of waste, threats to biodiversity, and can be harmful to their inhabitants (Elmqvist et al., 2013; Vojnovic, 2014). For example, car-oriented urban mobility systems cause e.g. large demand for petroleum, greenhouse gas emissions, soil sealing, and health risks (Vojnovic, 2014). To mitigate these problems and to achieve a more sustainable urban mobility system, transformations rather than incremental changes are necessary (Holzapfel and Vorreiter, 2017; Schneidewind et al., 2015; Wang et al., 2014; Wolfram, 2016).

However, municipalities are not only causes for sustainability problems, they are also key institutions for sustainable development and sources of innovation (Barber, 2013; West, 2017). Municipal policies directly impact their inhabitants' action. With land-use planning or by installing parking meters, municipalities can influence how people behave every day. Furthermore, municipal politics are close to the citizens. Universities, entrepreneurs, associations, and citizens can engage with the administration and build networks (Keeler et

¹ The German name is a pun, similar to "AudaCity". "Stadt-liche Ziele" translates to "City / imposing goals".

al., in review A). If these networks share a vision for sustainable development, municipalities can create positive momentum and move more boldly toward sustainability than the nation states they belong to (Kern and Alber, 2008). With small scales and effective networks, individuals like administrators can have great impact on the sustainable development of municipalities (Wang et al., 2014). Anecdotal examples are Michael Bloomberg, former mayor of New York City (population: 8'500'000) banning cars from Times Square in 2009 and Otto Wicht, an administrator from the small German city of Buxtehude (population: 40'000), who introduced widespread traffic calming zones in the 1980s to increase quality of urban life (Barber, 2013; Fromm, 2013).

There are three administrative groups in German municipalities: an elected municipal council as parliament, the mayor as the administration's elected head, and the administrative staff as the executive branch (Naßmacher and Naßmacher, 2007). Although the council decides on policy and the mayor heads the municipality, the non-elected administrators are essential as they have significant impact on the policy outcomes. They prepare political decisions by drafting statutes and offering different options to the council sometimes even "pushing [municipal councils] into the role of merely ratifying administrative decisions" (Naßmacher and Naßmacher, 2007). Once a decision is made, administrators have considerable leeway in the execution which Plawitzki-Schroeder (2017) calls "not apolitical".

Administrators gain that potential power from three sources: compared to the voluntary councilmembers and the general public, administrators have more expertise in their field (e.g. mobility) and in administrative processes, more time to spend professionally on each policy as they have a full-time position, and less immediate political responsibility toward the electorate (Plawitzki-Schroeder, 2017). These factors could enable German

administrators to become change-agents, using their position to foster sustainability transformations within the bounds of budgets and the democratic rule of law (Wang et al., 2014). To move municipal sustainability forward, administrators should embrace a proactive role as change-agents who use leverage points in municipal systems for a sustainability transformation (Abson et al., 2017).

1.2 Transformative capacities and capacity building

Because municipal governments are often not agile organizations, they tend toward incrementalism even in the pursuit of transformational goals (van Bree and Bouma, 2017). To achieve the transformational goals, there is a need in municipal governments to build transformative capacity so that municipal leaders can design, implement, and test plans, projects, and policies that are capable of transforming cities toward sustainability. Keeler et al. (in review A) define transformative capacity as the “practitioners’ competence, confidence, commitment, and power to initiate, facilitate, implement, or contribute to transformations.” Although it is an individual measure, a group’s collective transformational capacity increases with their members’. Keeler et al. (in review A) operationalize transformative capacity as follows: Competence means being able to plan, explore, and implement sustainability strategies. Confidence is the attitude that the administrator’s actions have the desired transformational impact. It is based on personal dispositions, experiences, and support from others. Commitment is the willingness to act and endure resistance. Power is defined as “the financial and temporal resources as well as authority and social capital” to promote the transformation. Although power is an external factor with little individual agency, how the individual perceives power has strong impacts on the other determinants of capacity.

The transformative capacity literature has yet to operationalize the determinants. However, other disciplines made similar attempts. Keeler et al.'s (in review A) definition of confidence is closely linked to the psychological concept of self-efficacy as introduced by Bandura in 1977: Self-efficacy is the expectation that one own's behavior has positive impact on a process' outcome. It is different to more passive cognitions like hope as it refers to the individual's actions. A person with high self-efficacy perceives herself to be able to make a positive impact and overcome barriers based on her perceived competences, past experiences of solving problems, and recognition by herself and others that past behavior has led to positive outcomes (Hunecke, 2013). Self-efficacy can be perceived individually and collectively (Jerusalem, 2013). Confidence and self-efficacy are often treated as synonyms, but self-efficacy is well operationalized (Hunecke, 2013). To root this research in the transformative capacity discourse, confidence will be used with the operationalization of self-efficacy. In terms of Keeler et al. (in review A), competence is a prerequisite for higher confidence, which in turn leads to higher commitment. Power is a frame that allows or inhibits transformative action externally and whose perception shapes confidence (Figure 1).

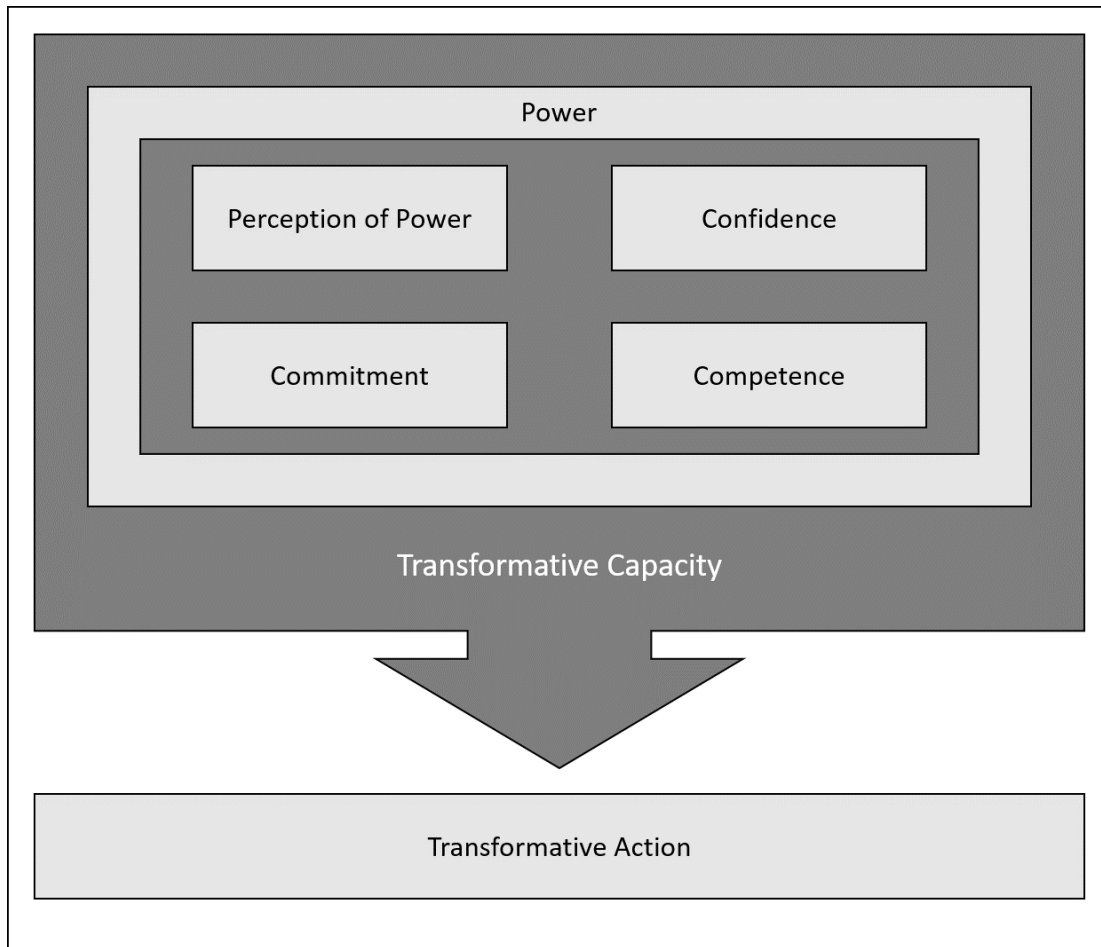


Figure 1: Transformational Capacity (own representation based on Bandura, 1977 and Keeler et al., in review A).

Higher transformative capacity of municipal administrators leads to better municipal sustainability performance (Keeler et al., in review A; Wang et al., 2014; Wolfram, 2016). Hence, some sustainability scientists build transformative capacity e.g. with city university partnerships (Keeler et al., in review B). By acknowledging and eliciting these stakeholders' local and procedural expertise, capacity building transcends from providing information to transdisciplinary research (Lang et al., 2012). This can be undertaken with varying frequencies and participatory degrees, ranging from regular core group meetings between administrators and scientists to more punctuated and intense formats like workshops with select stakeholders (Stauffacher et al., 2008). So far, these projects focused mostly on the co-creation of knowledge (Lang et al., 2012).

Capacity building is successful in existing and continuous city university partnerships, as for examples between Arizona State University and the City of Tempe, AZ, USA with the National League of Cities' Community Leadership in Resilience Program (NLCCLRP) or between Leuphana University Lüneburg and the city of Lüneburg in the project "Zukunftsstadt Lüneburg 2030+"² (Keeler et al., in review B).

1.3 Capacity building with game-based workshops

In capacity building workshops, game-play and simulations have been used for several decades (Kriz, 2000), and have increased tremendously in more recent years (Barnabè, 2014; Blanchard and Buchs, 2014; Eisenack, 2013; ElSawah et al., 2014; Katsaliaki and Mustafee, 2014). "Serious games provide learners with an authentic learning experience where the entertainment and learning are seamlessly integrated" (Katsaliaki and Mustafee, 2014). With specific rules, games can direct the discussion whereas playful and entertaining elements can create a relaxed and creative atmosphere. Many of these games include cooperative elements (Katsaliaki and Mustafee, 2014). Assembling participants who might know each other but who do not usually interact and having them jointly tackle a task can build a team spirit that enables administrators to work together on common ground in future encounters (Keeler et al., 2017). In an entertaining and engaging atmosphere, difficult concepts like sustainability can be conveyed effectively (Katsaliaki and Mustafee, 2014).

Most of the games examined by Katsaliaki and Mustafee (2014) focus on building competence, i.e. using the game to teach the target audience about concepts, specific problems, or solutions. Future Shocks and City Resilience, a game by Keeler et al. (2017) focuses on building competence, defined as sustainability ways of thinking (strategic, values,

² "Future-City Lüneburg 2030+"

futures, and systems thinking). Still, there is a need to consider if and how games can be used to build other determinants of transformative capacity, namely power, commitment, and confidence.

The determinants of transformative capacity act in concert. Thus, capacity building efforts aiming at one determinant can influence the others. Increasing an administrator's transformative competence, e.g. by using a game to teach sustainability solutions, could increase the administrator's confidence in mastering local sustainability problems by adapting the solution (Keeler et al., in review A)..

Confidence is well suited as an aim for a singular intervention in a game-based workshop because it is a personal cognition, based on the individual perception of existing resources like power and competence (Bandura, 1977). Without necessarily changing these resources, changing perceptions by shining a different light on them can increase players' confidence. In a game, leaving the *real-world* by accepting new rules and tackling tasks unfamiliar to the players can let them perceive their impact differently. Theoretically, games can increase the players' confidence by letting players perceive personal success, by encouraging players that their actions can be successful, and by giving positive feedback on the way barriers were successfully overcome (Jerusalem, 2013).

1.4 Research gap and research question

Many of the games teaching sustainable development focus on building competence, reflected in the accompanying research on their efficacy (Katsaliaki and Mustafee, 2014). However, so far there is little research exploring if and how game-based workshops build other determinants of transformative capacity. Hence this study's research question is: Can the game "Stadt-liche Ziele", as to be presented in section 2.2, build confidence as one

determinant of transformative capacity within the team of players? To answer this, three hypotheses are explored:

H1. “Stadt-liche Ziele” can increase collective confidence by rewarding collective successes.

H2. “Stadt-liche Ziele” can increase confidence by breaking down ambitious tasks into achievable steps which each overcome smaller barriers.

H3. “Stadt-liche Ziele” can increase confidence by acknowledging the participants’ actions that are already on the path toward a more sustainable system.

To explore these hypotheses, a case study was performed. The following section describes the case study and methods used to collect and analyze the data.

2 Methods

2.1 Case study

The German city of Lüneburg (population: 75’000) lies in the county of Lüneburg (population: 180’000), located ca. 30 km east of Hamburg. There has been a city university partnership since 2015 with the project “Zukunftsstadt Lüneburg 2030+”. The project co-produced a vision for 2030 in 2015, successfully utilized game-based workshops in 2017, and has built mutual trust that enabled this research (Bernert et al., 2016).

I identified Lüneburg’s mobility system as a field with high potential for a necessary sustainable transformation. Lüneburg is the regional center for the rural county and in the Hamburg Metropolitan Area. This means in- and outgoing regional traffic is significant, using highways, and regional and long-distance trains. Cars dominate the urban transportation system; however, the city’s dense layout allows for bicycle and pedestrian transport (Pez and Koch, 2013). Buses provide urban and regional public transit. The mayor identified the

urban mobility system as an area where a sustainable transformation should happen (Kim, 2017). The administration has little validated knowledge about each mode of transport's share in urban traffic. The most current figures are from 2001 (Thöring and Noak, 2007). Thus, building Lüneburg's administrators' transformative capacity for a sustainable mobility system seems necessary.

Six municipal administrators working on the mobility system for the city or the county at different levels participated in the study. They were recruited to collectively develop a strategy for Lüneburg's mobility system. Table 1 shows the participants' respective roles. The participants knew that game-based workshops were studied but they were not aware of the focus on confidence.

Table 1: Participants to the research with their respective roles in Lüneburg's municipal mobility administration and their participation in the research. Pr-I: Pre-Interview; Pr-Q: Pre-Questionnaire; WS: Workshop; Po-Q: Post-Questionnaire; Po-I: Post-Interview. Display order of participants is randomized.

Municipality	Position	Participated in				
		Pr-I	Pr-Q	WS	Po-Q	Po-I
City of Lüneburg	Office of public order (chief)	✓	×	×	×	×
City of Lüneburg	Sustainability coordinator	✓	✓	✓	✓	✓
City of Lüneburg	Transport and bicycle coordinator	✓	✓	✓	✓	✓
City of Lüneburg	Office of public order (responsible for traffic regulation)	×	✓	✓	✓	×
City of Lüneburg and County of Lüneburg	Climate protection agency	✓	✓	✓	✓	✓
County of Lüneburg	Responsible for public transit	✓	✓	✓	✓	✓

2.2 Game design

For this research and use in Lüneburg, I adapted the game "AudaCity" and translated it into German. It was designed and successfully tested by Lauren Withycombe Keeler at Arizona State University with the City of Tempe's administration (ASU, 2017). The German version contextualized for Lüneburg's mobility is called "Stadt-liche Ziele". In a backcasting approach (Holmberg, 1998), the players collectively defined a sustainability vision and built

backward a strategy that links the vision to the present. In the final step, the strategy built in the game was linked to the players' real-world activities. Table 2 shows the workshop's rounds as referred to throughout the text.

Table 2: Rounds of the "Stadt-liche Ziele" workshop 26th April 2018. Bold text indicates strong participant activity.

Round	Activity	Duration (minutes)
A	Reception	15
B	Pre-Questionnaire	08
1	Setting Goals	18
2	Adapting lifestyles	30
3	Taking action	38
C	Break	21
4	Overcoming challenge	24
5	First steps	18
D	Tallying points	17
E	Recontextualizing Strategy	10
F	Post-Questionnaire	03
G	Send-off	12

To ensure a focus on sustainability, the goals and the exemplary actions were chosen to be in line with Gibson's sustainability criteria (2006). The workshop was facilitated deliberately with the goal to increase confidence according to Jerusalem (2013), e.g. by positively acknowledging success with points. The backcasting and strategy building approaches ensured that the players' expertise was utilized, whereas the set of rules kept the discussion focused on sustainability and allowed the conversation to move forward. Appendices A and B comprise the gaming material.

2.3 Data collection and analysis

To measure diverse expressions of confidence, I used an ethnographic approach, gaining insights both on the content discussed and on the way the participants talked (Ulibarri, 2018). This allowed me to explore the participants' confidence before, during, and after the workshop. I conducted semi-structured interviews a few months before and a few days after the workshop. The face-to-face pre-interviews (30-75 minutes) gave a baseline for

confidence and helped contextualize the game. The telephone post-interviews (5-10 minutes) helped evaluate the workshop's impact on the participants. The workshop's conversation was taped. A research assistant noted observations about the group dynamics, focusing e.g. on non-verbal cues like sighs. I performed a qualitative content analysis using MAXQDA (DeCuir-Gunby et al., 2010; Mayring, 2014). Coding focused on dimensions of confidence and transformative capacity as well as on contextual factors of Lüneburg and the stepwise nature of strategies (Jerusalem, 2013; Keeler et al., in review A). Codes were assigned to "pieces of meaning" ranging from few words to whole paragraphs indicating the level of confidence (DeCuir-Gunby et al., 2010). For example, "[...] *I have just been here for a year and a half, basically every reaction [from politics] was mostly positive. [...] I did not have, I believe, a single negative decision [by the council] so far.*"³ ([2]⁴) was according to Jerusalem (2013) coded for a high level of general confidence, because participant [2] alluded to successes in her personal past to justify her belief in future successes. Appendix C comprises the complete codebook.

I adapted a tested and reliable psychological questionnaire originally dealing with school teachers (Schwarzer, 1999) to assess the participants' self-reported general and collective confidence at the beginning and the end of the workshop. The participants responded to items like "I can usually handle whatever comes my way" on a scale from one (low confidence) to four (high confidence). Ten items on general confidence yielded a score between 10 and 40, twelve items on collective confidence yielded a score between 12 and 48 and the sum of all 22 items yielded a score between 22 and 88. The scales were standardized between one and four. I kept the items asking about general confidence and changed items asking about the collective confidence among teachers and school to fit

³ The interviews and the workshop were conducted in German. I translated the quoted passages.

⁴ Pseudonyms [1] – [6] protect the participants' anonymity. If personal pronouns are inevitable, all participants are assigned a female gender, regardless of their actual identity.

municipal administrators and the mobility system (Tables 3a and 3b). I randomized the order of the items, all participants received the same order. Appendix D comprises the used German questionnaire.

Table 3a: Items for general confidence based on Schwarzer (1999). English translation by Schwarzer and Jerusalem (1995). General confidence is independent of the municipal administrative context and the topic of sustainable mobility. Thus, the items were kept.

Item according to (Schwarzer, 1999) dealing with teachers and schools	Adapted item dealing with municipal administrators and a sustainable mobility system
I can always manage to solve difficult problems if I try hard enough.	
If someone opposes me, I can find the means and ways to get what I want.	
It is easy for me to stick to my aims and accomplish my goals.	
I am confident that I could deal efficiently with unexpected events.	
Thanks to my resourcefulness, I know how to handle unforeseen situations.	
I can solve most problems if I invest the necessary effort.	
I can remain calm when facing difficulties because I can rely on my coping abilities.	
When I am confronted with a problem, I can usually find several solutions.	
If I am in trouble, I can usually think of a solution.	
I can usually handle whatever comes my way.	

Table 3b: Items for collective confidence based on Schwarzer (1999). English translation by me. Collective confidence is measured with a focus on collective action and context specific tasks. References to teaching staff and pedagogic tasks were changed to municipal administration and tasks related to a sustainable mobility system. Adaptions are **highlighted**.

Item according to (Schwarzer, 1999) dealing with teachers and schools	Adapted item dealing with municipal administrators and a sustainable mobility system
As we follow the same pedagogic goals, us teachers can also handle “difficult” students at this school.	As we follow the same sustainability goals, we in the administration can also handle “difficult” municipal politicians .
I believe in the strong innovative potential in our teaching staff, that enables us to implement innovations even in adverse conditions.	I believe in the strong innovative potential in the administration , that enables us to implement innovations even in adverse conditions.
I am convinced that we as teachers can collectively ensure pedagogic quality, even if the school’s resources were to decrease.	I am convinced that we as the administration can collectively ensure a sustainable mobility system , even if the city’s and county’s resources were to decrease.
I am sure that we as teachers can achieve pedagogic success because we act in concert and don’t let daily struggles distract us.	I am sure that we as the administration can achieve sustainable success because we act in concert and don’t let daily struggles distract us.
Our teaching staff can come up with creative things to effectively change school life, even if external conditions are not favorable.	Our administration can come up with creative things to effectively change the city and the county , even if external conditions are not favorable.
We will surely be able to do pedagogically meaningful work, because we are a competent teaching staff and we can grow with difficult tasks.	We will surely be able to do sustainably meaningful work, because we are a competent administration and we can grow with difficult tasks.
Even from pedagogic mistakes and setbacks we teachers can learn a lot, as long as we trust in our collective competence to act.	Even from mistakes and setbacks on the way to a sustainable mobility concept we as the administration can learn a lot, as long as we trust in our collective competence to act.
Despite systemic constraints we can improve our school’s pedagogic quality because we are a smoothly operating and capable team.	Despite systemic constraints we can make our mobility system sustainable because we are a smoothly operating and capable team.
I trust that us teachers at our school can collectively achieve to implement pedagogic projects, even if difficulties arise.	I trust that us as the administration in the city and the county can collectively achieve to implement projects for a sustainable mobility system , even if difficulties arise.
We manage to convince “difficult” parents from our pedagogic goals, because we act as a uniform teaching staff.	We manage to convince “difficult” inhabitants from our sustainability goals, because we act as a uniform teaching staff.
I am sure that us teachers with collective action can achieve a good school climate, if work outgrows us.	I am sure that us as administration with collective action can achieve a sustainable mobility system , if work outgrows us.
We can manage even extraordinary events as we in the teaching staff back each other.	We can manage even extraordinary events as we in the administration back each other.

Together, the interviews before and after the workshop, the workshop's recorded audio, the observations, and the questionnaires provide a differentiated measure for confidence to explore the impact of the workshop on the team.

3 Results

The results section presents general findings taken from the interviews, the observations, the workshop's transcript, and questionnaires. Given this study's exploratory design, the focus is on general themes demonstrating the level of confidence. The quotes, although attributed to individual participants, show expressions typical of the team. General impressions of confidence appear first, followed by results referencing the three hypotheses and a summary of findings. The data generally shows high confidence during and after the workshop.

3.1 General observations

Before the workshop, the participants expressed mixed levels of confidence. Participant [4] seemed least confident: *"But [reducing transport's CO₂-emission] is nothing we can change on the local level. [...] We can't force the people to use a certain mode of transport."* The others displayed balanced levels of confidence. The common theme for low confidence was the perceived lack of power. Factors for high confidence varied individually and touched on high commitment ([5]), trust in stepwise success ([3]), and prior personal successes ([2]). The participants in the pre-interviews and the workshop largely agreed with the need for a more sustainable mobility system in Lüneburg.

Throughout the workshop, expressions of low confidence were mostly based on a perceived lack of power, e.g. by pointing out how the mobility system undergoes changes that are driven by *"external actors, that are hardly or barely influenceable by the municipality"* ([3]).

Participants mostly seemed confident referring to incremental successes, their own commitment, and Lüneburg's supportive characteristics (*"I believe the Lüneburgians would go along much more with [expanding bike lanes]"* – [5]).

The participants, the observer, and I perceived the atmosphere during the workshop positively. As [3] pointed out in the post-interview: *"That was relaxed, also with an occasional quip, but still very goal-oriented and playfully serious."* [2] and [3] said the workshop enabled them to achieve better sustainability outcomes with their administrative work, whereas [4] and [5], again, referred to lacking power.

3.2 Collective successes and collective confidence

Collective confidence increased with the workshop. During the send-off and in the post-interviews, each participant expressed appreciation for bringing together the group in a novel constellation and building familiarity. Furthermore, using game-play *"so that one realized that one can speak, think a bit more freely"* ([3]) were praised. However, participants [4] and [5] dominated the group discussion. They sometimes framed the discussion with high ([5]) or low ([4]) confidence, setting the tone and influencing the other participants in forming their opinions.

Without a prompt, the three city administrators discussed how the absence of their supervising department head might have affected the workshop: *"[She] would have pulled this into another direction. [...] which would not be congruent to ours."* ([5]) This indicates low collective confidence by the present participants regarding the hierarchy, showing how closely linked confidence is to the perception of power.

To build confidence, the game rewards collective success with points. Two participants seemed eager to perform well. After being told that their team scored more points than at

the game’s pilot at ASU, [4] reacted with *“I don’t believe that”*, indicating that collectively Lüneburg’s administrators can overcome a barrier like beating a game together.

Supplementary to the qualitative data, the psychological questionnaire measured general, collective, and overall confidence (Figure 2). The focus of this research is the general impact of the game on the group of players, hence the *mean* columns are highlighted. Although there is variance between the individuals, on average collective confidence increased, being in line with the qualitative data.

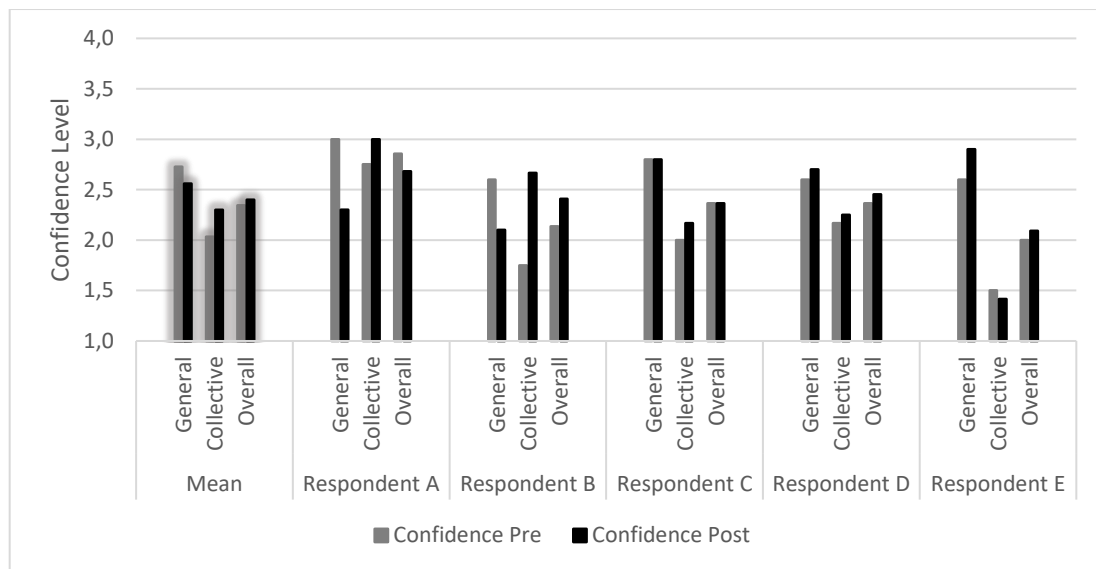


Figure 2: General confidence, collective confidence, and overall (general + collective) confidence on a scale of 1 to 4 immediately before and after the workshop, measured with questionnaires according to Schwarzer (1999). Changes from light to dark indicate changes during the workshop. The questionnaires were anonymous; Respondents A-E represent the participants, but do not correlate with the pseudonyms [2]-[6].

3.3 Breaking down ambitious tasks and overcoming small barriers

Initial reactions to the goals were negative (*“Currently, this goal, [...] would be very far away. I wouldn’t say 2030, but rather 2050”* [5]). However, when relating the goals to current activities and breaking them down into urban lifestyles, the participants expressed higher confidence (rounds 1 and 2).

In round 4, the game tasked the participants to evaluate the effect of a restrictive municipal council on the actions developed in round 3, expressing varying levels of confidence. They were highly confident for some actions, saying the political challenge would not affect them. E.g. the optimization of traffic lights that *“thank God is an area that politics is always overwhelmed by and that they always say yes and amen to”* ([5]), defies the argument of lacking power. There were few actions that elicited expressions of low confidence, e.g. traffic calming. The participants accepted their lack of power and expressed hope that some other stakeholders might sponsor the transformative action. As hope for other people’s action is not related to own behavior, this is a sign of low confidence.

Overall, breaking down the ambitious task into achievable actions and overcoming smaller barriers coincided – with limitations – with expressions of higher confidence.

3.4 Acknowledging real-world actions in game

At three stages of the workshop, the participants were explicitly asked to recount activities currently undertaken by the municipal administration for a more sustainable mobility system. In rounds 1 (setting goals) and 5 (first steps), current activities were used to ease into the in-game world and to return from it, before using round E (recontextualizing strategy) to fully re-emerge into Lüneburg’s current plans. Each round elicited expressions of high confidence. In addition, participants expressed higher levels of confidence while discussing individual actions in rounds 3 and 4 when they could relate a proposed action to their current activities, mostly showing high commitment.

An example typical of the group is [5] who remarked in her first steps, that she wants to continue moving forward with bicycle friendly infrastructure on main roads, using a road currently undergoing renovation as an example: *“If that succeeds, and I believe this will succeed, we can use it for other routes.”*

Rooting the in-game discussions in the participants' real-world activities coincided with high confidence.

3.5 Summary of results

Before the workshop, the level of confidence varied between the participants, but it was generally low. I could find an increase in the collective confidence among the participants, coinciding with achieving success together through gameplay. As the participants broke down the ambitious goals into smaller actions and when they adapted them to cope with a potential challenge, their confidence increased. Finally, when the participants could relate their current actions to the in-game activities, they were more confident.

4 Discussion

This research set out to explore, whether "Stadt-liche Ziele" can build confidence, a key determinant for transformative capacity, within the team of players. The results indicating an increase in confidence within the group of players are discussed against the concepts on transformative capacity, sustainable municipal administration, and confidence as laid out in the introduction.

4.1 Establishing a baseline

As transformative capacity, especially confidence, according to Keeler et al. (in review A) are personal measures, the interpersonal variance of confidence observed before, during, and after the workshop was expected. The low to moderate levels of confidence before the intervention showed that a workshop aiming at building confidence was theoretically and empirically warranted. The most prevalent factor for low confidence being a perceived lack of power within the administrative system is in line with Plawitzki-Schroeder's findings (2017). It also fits the confidence theory defining confidence as an internal resource

interdependent with perceived external resources (Jerusalem, 2013). Hence, I adapted the game to encourage actions that are in the administrators' power.

Furthermore, I invited the sustainability department head to change the perception of power dynamics in the game to elicit an egalitarian sense between the administrators of different levels. Being forced to work together and experiencing how the superior in-game takes bolder actions than in real-life could change the perception of power. It is however questionable if this would have succeeded. During the workshop, the department head's subordinates remarked their boss' absence positively, and that it allowed them to speak more freely. However, as [5] in the post-interview and theory (Jerusalem, 2013; Keeler et al., 2017; Plawitzki-Schroeder, 2017; Wang et al., 2014) suggest, administrative leaders encouraging employees and taking transformative action are important. I suggest further research to study how teams of superiors and subordinates can successfully build collective confidence and change the perception of power.

4.2 Collective successes and collective confidence

Hunecke (2013) argues that confidence can best be built with "well dosed personal experiences of success."⁵ Hence, a game that uses points to reward success is theoretically expected to build confidence, as reflected in Hypothesis H1. This seems to be supported by the data collected in this study, as two participants appeared eager to gain many points.

As the game rewards the team collectively and forces all participants to work together, it successfully built collective confidence. The questionnaire and the post-interviews showed an increased level of collective confidence after the workshop. The group constellation was novel, as two participants met for the first time that day, which was praised to contribute to establishing a common ground within the administration. This is relevant to sustainability

⁵ Own translation from German

performance as transformations sponsored by administrative teams are likely more successful than those headed by individuals (Wang et al., 2014).

To successfully build collective confidence in a game-based workshop, deliberate facilitation is necessary. It is important to emphasize the game's collective nature, to reward collective successes, and to assure a positive group dynamic and atmosphere (Parker and Tritter, 2006). While I, as the facilitator succeeded in creating a positive atmosphere, I could have better focused on avoiding the dominance of participants [4] and [5], e.g. by specifically asking quieter participants.

The results strengthen the plausibility of hypothesis H1; apparently "Stadt-liche Ziele" did increase collective confidence by rewarding collective successes.

4.3 Breaking down ambitious tasks and overcoming small barriers

Hypothesis H2 is grounded in the sustainability literature and in the confidence literature. Unpacking an ambitious task into manageable portions is familiar in sustainability strategizing. For instance, Wiek and Iwaniec (2014) stress the importance of tangible goals in sustainability visioning and strategizing. Jerusalem (2013) argues that to increase confidence by creating experiences of success, it is helpful to have "challenging, but achievable short-term goals."⁶

The game set out to do so by two measures. First, the players were instructed in the first two rounds to collectively break down the ambitious goals of a more sustainable mobility system into detailed changes of urban lifestyles. Their reactions, changing from rejecting the goal as too tasking to expressing higher levels of confidence when it was broken down, are in line with theoretical expectations. Second, breaking down the task into smaller pieces by

⁶ Own translation from German

discussing specific available municipal actions and their resilience toward a political challenge, yielded less conclusive data. The coping strategies to overcome foreseeable barriers indicate varying levels of confidence, depending on the apparent feasibility of the discussed action. Trying to adapt actions that were already deemed difficult rather brought frustration instead of success. Only those actions initially perceived positively evoked expressions of high confidence when the players changed them to overcome the challenge.

This suggests that apparently breaking down an ambitious task into manageable pieces is helpful and can be achieved by “Stadt-liche Ziele”, thus hypothesis H2 remains plausible. However, there are limitations to this. If an item by itself evokes doubt, tasking the participants to overcome a barrier can reinforce low confidence. Hence, it is fundamental in game design and facilitation to strive for actually giving “challenging, but *achievable* short-term goals” (Jerusalem, 2013).

4.4 Acknowledging real-world actions in game

Sustainability transformations are connected to current and past activities, even if only to inform a direction from which to depart – no transformation can be isolated from earlier paths (Schneidewind et al., 2015). A sustainability transformation that can maintain the positive momentum created by past sustainability efforts is more likely to succeed than one that attempts to perform a whole 180° turnaround. Hypothesis H3 acknowledges this.

To build confidence by internal and external acknowledgment of success (Hunecke, 2013; Jerusalem, 2013), rounds 1 (setting goals), 5 (first steps), and E (recontextualizing strategy) explicitly directed the players to name and take pride in current activities that are in line with the sustainability goals. Participants expressed high confidence, showing strong commitment to their actions and a belief that these actions contribute to a more sustainable mobility system. Whereas in round 1 only two participants showed high

confidence, the final round of recontextualizing the strategy built during the game with current activities generated expressions of high confidence from all participants. This indicates that within the team confidence was built.

The game design, focusing on synergetic actions and relating in-game success to real-world actions, acknowledged the participants' personal competences and successes, apparently building confidence in all participants. The results strengthen the plausibility of Hypothesis H3.

4.5 Overall reflections on the game-based workshop

Despite maintaining the plausibility of all three hypotheses, indicating that "Stadt-liche Ziele" did build confidence in the participating municipal administrators, this workshop's impact is limited.

To successfully conduct a game-based workshop, the participants need to be open-minded about the format. They must be convinced that the activity is serious and benefits their work. As [4] put it in the post-interview: *"I don't really want to call it a game. Playing games is what kids do, but this was a serious thing."* This stresses the importance of building trust between the administration and the research team before asking administrators to *play a game*. Hence, it is important to embed game-based workshops in a continuous project (Keeler et al., in review B).

As Plawitzki-Schroeder (2017) found out, municipal administrators can only be change-agents within the legal framework that allocates political power and financial and human resources. The perception that this external framework inhibits transformative action was expressed by all participants to varying degrees before, during, and after the workshop. While such a workshop cannot aspire to change power's formal distribution e.g. between

the council and the administration, it could change the perception of power and thus help in building confidence. This was not the intended outcome of “Stadt-liche Ziele”, but I suggest that techniques should be researched to address the perception of power, for instance by demonstrating the advantages of collective over individual action (Wang et al., 2014).

Thirdly, while the “Stadt-liche Ziele” workshop as intended had positive impact on the administrator’s confidence, it did not have measurable immediate real-world impact. However, the workshop broadened the participants’ field of view, as [3] pointed out in the post-interview. It is important to use the confidence built in this workshop to make even more use of the participants’ expertise by serializing the intervention and balancing confidence and competence building, as can be found at ASU (ASU, 2017).

Overall, for future capacity building efforts, I suggest performing a series of interventions with a more diverse cast of participants regarding hierarchy and different foci on building confidence and achieving real-world impact. Because the workshop was successful in building collective confidence I suggest placing “Stadt-liche Ziele” first, before venturing into more content-based activities.

5 Conclusions and outlook

“Stadt-liche Ziele” succeeded in building confidence within the team of players in three ways. First, making the participants play as a team increased their collective confidence. Second, breaking down the seemingly insurmountable goals into achievable steps that build on one another created experiences of success, building confidence that the overarching goal can be reached. The data shows however that it is fundamental that each proposed step is indeed achievable. Third, acknowledging and rewarding how the participants with their current actions are already on a path toward sustainability led to higher confidence.

However, the data also showed how the perceived lack of power inhibits transformative action by the administrators. This issue should be tackled with hierarchically more diverse participants and another format than the tested game.

The results and conclusions drawn from this research are based on one single intervention with six participants. This is sufficient to initially explore the efficacy of “Stadt-liche Ziele”, aiming at building confidence. Future studies with larger sample sizes should be conducted to validate the results. They should examine especially how different topics, local factors, and individual personalities influence the outcome of the workshops. In doing so, methods should be developed to reliably measure the individual’s development of confidence opposed to this study’s collective approach. Future research should also study whether “Stadt-liche Ziele” can be successful for teams with mixed hierarchies. In addition to validating the findings for confidence and building on the vast literature on increasing competence through game-based workshops, future research should examine whether game-based workshops can be effective to build commitment and change the perception of power, to cover all determinants of transformative capacity. It should be examined at what stage in a long-term capacity building project game-based workshops are most promising.

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