

Driving pro-environmental practice change and food waste reduction in (and around) professional kitchens: Connecting materiality and meaning

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ABSTRACT

This paper examines how interventions via the physical working environment can be used to promote behaviour aimed at food waste reduction. Building on theories of practice, data were collected at luxury hotels using multiple methods, encompassing document analysis, observation and interviews. A new set of protocols for waste collection were introduced in the kitchens to drive practice change among chefs and associated personnel. The findings suggest that the intervention was initially met with resistance, which was attributed to the misalignment of meanings associated with this initiative among practitioners. However, subsequent human and non-human interventions helped to create new shared meanings that drove changes in attitudes and behaviours. The findings show how this initial focus on materiality led to change in 'meaningful knowledge', and subsequently shared meanings. Moreover, the data stress that practice change is constrained when shared meanings are not established and mobilised effectively. Overall, the study demonstrates how organisational practices concerning food waste can be modified through small-scale interventions, coupled with additional reinforcement strategies.

1. Introduction

Food waste within the foodservice and hospitality sectors is widely acknowledged to be a critical issue, with wide-reaching moral, environmental and economic implications (Filimonau et al., 2024; Lévesque et al., 2023; Montesdeoca-Calderón et al., 2024). Previous research has suggested that two-thirds of food waste generated in the hospitality sector is directly attributable to kitchen operations, primarily through production waste and spoilage (WRAP, 2013). This is driven by the interaction of numerous organisational factors, including brand standards, institutionalised procedures and operational practices across the production and service cycles (Chawla et al., 2021, 2025; Lévesque et al., 2022). However, kitchens and the chefs who manage them play a central role in the prevention and management of food waste (Chawla et al., 2021; Filimonau et al., 2023). Kitchens can be viewed as material work environments encompassing a range of 'non-human' actors (i.e. equipment, furnishing, layout, foodstuffs etc.) that chefs interact with routinely as part of their work (De Landa, 2022, pp. 46–48). The ongoing interactions between non-human actors and their human counterparts (i.e. chefs) shape practices by facilitating some behaviours and routines while constraining others (Chawla et al., 2020; Hennchen, 2019; Sezerel

and Filimonau, 2023). Alongside materiality, chefs also engage with and mobilise craft knowledge, attitudes, subjective norms and meanings, which can also drive or undermine pro-environmental behaviour that determines how food waste is perceived, understood and managed (Chawla et al., 2022, 2025; Filimonau et al., 2024). For example, food waste may be viewed by chefs and associated staff as inevitable and thus normalised in shared practices, but waste may be seen as value destruction because of its environmental and economic costs (Chawla et al., 2025). Shifting (or reinforcing) the meanings associated with food waste among chefs and related hospitality staff can contribute to driving pro-environmental behaviour to ensure that reduced waste generation and responsible waste management become embedded in operational practices (Chawla et al., 2025; Filimonau et al., 2024).

Chefs' food waste-related operational practices within kitchens have received limited attention (Batat, 2020; Chawla et al., 2020; Filimonau et al., 2020). Adopting a practice theory approach to study them is appropriate, since human behaviours are guided by prevalent practices, commonly seen as socially accepted codes of conduct (Hennchen, 2019). This perspective is particularly relevant in luxury hotel operations because a) processes are often scripted and routinised to deliver exacting standards consistently, and b) kitchen operations are team-based and

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thus function according to socially embedded routines. Moreover, luxury hotel properties often attract criticism for being food waste hotspots (Gannon et al., 2023), and hence the present study focuses on this sub-sector of hospitality and foodservice.

Studying chefs' embedded practices is important because their capacity to negotiate organisational demands, while utilising their competencies and enacting their professionalism, shapes how food waste is created and thus reduced (Chawla et al., 2020; Filimonau et al., 2023, 2024). Scholars have advocated using theories of practice to conceptualise and study chefs; however, the application of practice theories to analyse the prevention and management of food waste remains limited (Filimonau et al., 2024; Hennchen, 2019; Sezerel and Filimonau, 2023; Reardon et al., 2024).

The present study examines the interactions between materiality and meanings in driving pro-environmental behaviours among chefs, and associated staff, which underpin their organisational practices regarding the generation and management of food waste in professional kitchens. The paper assesses the effects of a set of interventions initially focusing on the material environment – specifically, the introduction of new (smaller, transparent) food waste containers – considering how associated shifts in meaning concerning food waste shaped their pro-environmental behaviours and shared procedures. The overall aim is to examine how practice change focusing on food waste prevention can be prompted within an organisational context. To achieve this, the paper addresses three research questions.

RQ1. What are the impacts of introducing a new non-human actor (i.e. the waste containers) into the professional kitchen?

RQ2. What are the meanings associated with food waste and the introduction of a non-human actor?

RQ3. What are the interactions between the material intervention and emergent meanings and their impacts on pro-environmental practice change?

In addressing these questions, the paper contributes to knowledge regarding the practical challenges and opportunities of utilising a material intervention to help change meanings associated with food waste generation, its reduction and its responsible management. Moreover, it builds on past work (e.g. Hennchen, 2019; Sezerel and Filimonau, 2023) by demonstrating how materiality and meaning can be mobilised to drive pro-environmental practice change. The theoretical implication is that the interactions between materiality, meanings and competencies are tied to (and thus moderated by) notions of occupational (and organisational) community, identity and belonging because 'members' valorise the knowledge and skills enacted through pro-environmental practice.

2. Literature review

2.1. Practice theory

For practice theorists, mundane acts, routines and embedded rituals are of significant importance (Shove et al., 2012). Everyday social life is understood to consist of a wide range of practices, which create the social codes that guide human behaviours. Hence, a practice approach can help uncover various facets of human behaviours (Halkier et al., 2011; Warde, 2014). Practice theory examines the 'doing' itself, and human actors are viewed as 'carriers of practice' (Reckwitz, 2002). Practices have their own sequence and rhythm (Schatzki, 2002) and stabilise when carried out repeatedly (Reckwitz, 2002). Consequently, practitioners can often be found 'locked into' practices, as repeatedly performing established practices requires little deliberate thought or cognitive effort (Southerton, 2012; Warde, 2005).

The centrality of practices in maintaining social order within a social or organisational context is a key premise of practice theory. Each organisation has its own character and ways of doing things, which

become embedded and normalised over time (Schatzki, 2005). If workplaces are viewed as an assemblage of practices, there is currency in the argument that behaviour change can be achieved by changing social practices (Hargreaves, 2011; Warde, 2005). While many practices are scripted and institutionalised by the management, some may emerge informally and organically, based on a common purpose (shared meanings) between practitioners. The individual actor (employee) is likely to follow such practices to be part of the organisational social group.

Shove et al. (2012) posited that three essential elements that come together to define practices: materials, meanings and competencies. Competencies are skills and know-how, including the tacit knowledge of the actor, that permit or lead to activities being undertaken in a certain way. Materials refer to physical objects that hinder or allow certain activities to be performed in specific ways. Examples include technology, tools, devices and infrastructures. Meanings are images, interpretations or concepts associated with activities that determine how or when they are performed. Reckwitz (2002) added that the practice will 'hold up' through the interconnectedness of these three constituents.

Though this conceptualisation is helpful, it is arguably overly simplistic as the three components do not have clear boundaries in relation to each other and are partly embedded in the practitioner (Røpke, 2009). For example, it would be difficult to separate plate (material object) from skilful plating (competence). For that reason, Reckwitz (2002) noted that human actors have no agential priority over material objects in the performance of practice. At best, agency is distributed between actors and the network, hence the need to study practices in the organisational contexts that they are performed.

2.2. Practices and professional kitchens

Shove et al.'s (2012) framework can be applied to commercial hospitality operations. Materials encompass storage facilities, knives and scales, plates, cooking and serving equipment, freezers, work surfaces etc. Key decisions regarding the material environment and equipment are likely to be predetermined by the organisations that design and furnish kitchens, but chefs may also introduce new material elements for example, their personal knives or clothing. Chefs' skills may include reliable forecasting, creative use of leftovers, standardised portioning and controlled purchasing. Some of these capabilities are learnt through formal occupational socialisation and training, or informal organisational socialisation as chefs adopt localised ways of performing tasks. The meanings associated with meal preparation, service and the consumer experience may emerge from organisational policies and culture, brand standards, pricing structures etc. Importantly, the intersection of materials, competencies and meanings generate and propagate operational practices. Driven by the argument that practices are nested and hence boundaries between various practices are often blurred (Halkier et al., 2011; Røpke, 2009; Warde, 2005), it is necessary to analyse a wide range of interconnected practices in their organisational context to understand how and why some practices change and others remain stable. Therefore, practices spanning the entire commercial foodservice cycle are relevant for this study, since each contributes to food waste and impacts others. The key operational domains include forecasting, procurement, receiving, storage, food preparation, service and waste disposal. These domains and associated practices and sub-practices within are presented in Table 1.

Martin-Rios et al. (2018) and Munir (2022) noted that much of practice-based research on food waste in food and hospitality has focused on technological advancements, while meanings have received significantly less attention. Consequently, Munir (2022) called for the 'meanings' element of practice to be studied. This appears warranted as changes to work-based practices require practitioners to invest time and energy in developing new routines, imbuing them with new meanings, which have to be accepted for others to adopt them as organisational

Table 1
Key operational domains, practices and sub-practices.

| Operational domain | Associated practices |
|--------------------|--|
| Forecasting | Need identification, estimating quantities, stock taking. |
| Purchasing | Developing purchase specifications, sourcing, frequency of ordering. |
| Receiving | Quality checks, weighing, counting, temperature checks, record keeping for HACCP (hazard analysis and critical control points), storing, food labelling. |
| Storage | Stock rotation, product labelling, ensuring correct storage conditions (temperature, lighting, humidity etc.), refrigeration, freezing. |
| Production | Pre-preparation (cleaning, cutting, marinating), pre-cooking, preparation (cooking), cooking quantities (bulk vs batch cooking). |
| Service | Portioning, garnishing, plating, buffet replenishment. |
| Waste management | Food waste monitoring, waste recycling, reuse, waste disposal methods. |

practice. This paper responds to this call and thus contributes to knowledge by examining how meanings in chefs' work are (re)shaped in the development of new organisational procedures, which act as pathways to the creation of new practices. By doing so, this paper also makes contribution to the literature by showing how changes in meanings drive processes of practice change. Furthermore, the paper addresses the issue of agency by demonstrating how different actors rely on each other in order to influence waste prevention-related practices. Lastly, the study exemplifies that small-scale interventions can provoke significant change as far as organisational pro-environmental outcomes are concerned.

3. Materials and methods

3.1. Research context

Primary data were collected at two luxury hotels, one in the United Kingdom, the second in Germany. Several criteria were used purposefully to select the sample. First, to allow comparison, the hotels had to be similar luxury-grade properties, affiliated with the same parent organisation, using a centralised procurement system. Second, to ensure informational consistency, the organisation needed to have an established system of sustainability reporting, which generated accessible food waste data. Several hotels that met these criteria were considered, but the managers of two properties responded favourably to participating in the research and to facilitating the intervention. Management support was deemed critical because the project involved accessing 'back-of-house' spaces, analysing sensitive operational data and intervening in existing working practices. Studying multiple field sites offered the chance to observe patterns across both empirical cases, making it possible to identify convergence and divergence in data. This strategy allowed for methodological and data triangulation; it helped to examine the value-action gap, and it reduced the potential impact of social desirability bias.

A range of practices from across the food production, service and disposal stages were examined (see Table 1). The breakfast buffet service was purposefully selected for study at the two field sites for three reasons. First, within hospitality, the breakfast service has long been recognised as a food waste hotspot (Juvan et al., 2018). Second, the breakfast menu was standard across the hotel chain, which enabled us to compare practices. Third, the hotel chain's centralised purchasing system added a level of consistency across and within the two field sites.

3.2. Data collection

Primary data collection involved four interrelated set of activities. The first activity was analysis of key documents pertaining to food

waste. Several documents such as the company-wide ethical procurement policy and departmental communications were studied alongside the menus, standard recipes and sustainability reports. The collection and analysis of documentary evidence throughout the study helped us to appreciate the organisation's broader aspirations, and how the owners and managers expected things to be done to meet specific goals.

The second component of the fieldwork involved conducting interviews with the key personnel who were involved in food planning, production, service and disposal practices. The material intervention discussed in this paper focused primarily on chefs' practices and their work domains, but it is important to recognise that chefs collaborated with other organisational actors and their social practices interacted. Consequently, the participants were selected purposely, based on their specialist knowledge of or their ongoing involvement in food handling practices, because their insights and practices related to waste generation, monitoring and its management. Individual semi-structured interviews were conducted with 16 members of staff, each lasting 45–60 min. Participants included members of senior management (head chefs, general managers, director of operations, food cost controllers, and food and beverage managers), middle management (sous chefs, restaurant supervisors, breakfast supervisors) and operational staff (cooks and waiters).

In addition, three group interviews involving ten participants from across these management and operational layers were conducted. The decision to conduct group interviews was pragmatic. Only a few members of staff spoke English at the German hotel. Group interviews helped to facilitate the discussion. In other cases, participants worked in the same areas and it was more practical to interview them together.

Interviews examined participants' conceptions of food waste, as well as their experiences, understanding and perceptions of food waste-related practices and their management. This included organisational communications concerning food waste and previous behaviour change initiatives implemented by the hotel, and their consequences. To help contextualise their practices and understandings, the interviews also explored interactions with other departments and organisational actors. The same core questions were asked at group and individual interviews (see Appendix for an overview of the interview schedule).

Interviews were repeated and ongoing interactions with many of the participants during the fieldwork enabled the researcher to ask follow up questions and clarification on points raised previously. Capturing data from a wide group of practitioners, spanning several operational areas and roles, at different points in the study, helped to limit potential bias. This also made it possible to compare and contrast participants' views, identify gaps, seek clarification, probe and challenge, if needed.

Interviews were audio recorded and transcribed manually by the first author to ensure accuracy and consistency. Importantly, the one-to-one interactions in and around the formal interviews were instrumental in helping to build rapport between the staff and the researcher. These interactions also provided opportunities to discuss the next component of the study, which involved the introduction of a new and disruptive 'non-human' actor.

In the third component of fieldwork, the large 240-L collection bins typically used to collect food waste were replaced with smaller, 20-L transparent tubs. A set of three tubs, one each for preparation, spillage and plate waste was placed in every section of the kitchen. The objective of introducing new bins was to sensitise employees and managers towards food waste. With the introduction of new bins, chefs were asked to note food waste created at their station. Printed waste tracking sheets were provided and collected at the end of each week. This was followed by a series of supporting activities, including written and verbal briefings, and internal communication campaigns that sought to convey the purpose and value of the intervention (See Fig. 1 for an overview of the intervention process and activities).

The fourth strand of data collection involved in-situ observation of chefs' work(ing) practices. This afforded the opportunity to examine practices performed 'behind the scenes', often hidden away from public

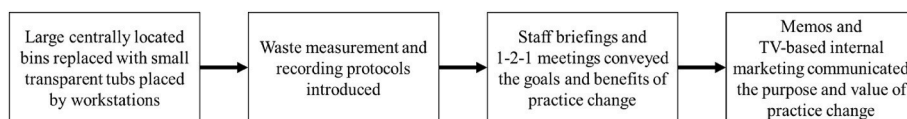


Fig. 1. Intervention process and activities.

gaze, and it enhanced understanding of potential meanings associated with these practices. One member of the research team played the role of 'observer-as-participant'. Observations spanned several weeks, including weekdays and weekends with the intention of capturing variability in business and consequent impacts on food waste. From a spatial perspective, observations included food production areas and other locations such as the receiving bay, dishwasher, service stations and waste disposal areas. Collecting data from across these locations helped to construct a holistic understanding of the organisational context and the practices surrounding food waste.

Observations were overt and as unobtrusive as possible, field notes were written manually on paper and observation logs were created to capture straight descriptions of events as they unfolded. In addition, reflective notes were added, where appropriate (for example, when interpreting meanings that informed peoples' actions). Participant observation naturally provided opportunities to engage further with practitioners, which allowed us to capture interconnected doings and sayings (Schatzki, 2002). Hence, naturally occurring conversations pertaining to study topic were recorded with consent.

3.3. Data analysis

Analysis of qualitative primary data was based on reflexive thematic analysis (Braun et al., 2023). Interview transcripts and observation logs were read and reread several times by the first author who conducted the field studies. Analysis initially focused on describing and assessing different stages of the production and service cycle to understand its components and processes alongside embedded practices and norms. Open coding was conducted as broadly as possible, resulting in 404 codes across the entire data set. Examples of codes generated at this stage included: menu design, food safety legislation, unpredictable demand, customer expectations, unavoidable waste, portion size, excessive garnishing, first-in-first-out (FIFO), portion size etc.

The analysis narrowed to examining higher-order theoretical issues, for example, perceptions of and attitudes towards changes in organisational routines among different actors, and how behaviours and practices changed or remained stable in specific domains. This focused coding yielded 118 codes. Examples of codes created through this process included: consumer behaviour, social norms, resources and infrastructure, habits and routines, skills and experience, employees' perceptions and the process of practice change. The codes were then reordered into three thematic areas, based on Shove et al.'s (2012) framework, although the data interpretation was not limited to their categorisation. Across each phase of the analysis the wider team evaluated the coding for coherence and redundancy, assessed their attribution to first-order thematic areas, and challenged interpretation to ensure that higher-order themes were comprehensive and distinct.

4. Findings and discussion

It was anticipated that the introduction of new bins would not lead to significant operational disruption. In reality, the opposite was evident. Chefs began to debate how to reorganise their working practices to accommodate the new agent. There were lengthy discussions about a) where the bins should be placed, space being limited; b) where the large bins should be moved to, as the small ones would fill quickly; c) who was responsible for transferring contents from small bins to large ones; d) how often should transfer take place; e) who should record waste data

and in what form; f) how to record preparation waste for the next day's service, but which ended up in the bins that day; g) how costs associated with the change in practice were to be accounted for; h) how to identify what food product belongs to which bin; i) access to accurate data about number of diners served; j) weather the new bins were dishwasher safe; and k) how durable the bins were.

These points reflected pragmatic considerations, but they also provided insights into the cognitive efforts required to mobilise practice change in this organisational context. Furthermore, these discussions indicated that a single intervention could provoke disruption to several interconnected practices. This might be explained by the fact that practices do not exist in isolation, but are bundled (Halkier et al., 2011; Sahakian and Wilhite, 2014). Importantly, practice theorists have argued that it is the shared meanings that give rise to social norms that hold practices together (Shove et al., 2012). The practitioners in this context did not necessarily grasp the higher-order meaning embedded within this intervention. They questioned the purpose, required resources vs benefits and authenticity of the intervention. Table 2 provides an indicative overview of the participants' comprehension of the intervention, the explanation of their interpretations, with exemplar evidence from the primary data. The intervention was seen as an extension of management surveillance and an attempt to regulate the workplace in pursuit of a larger corporate agenda, which was against chefs' interests as autonomous professionals. Moreover, the increased burdens were seen as job enlargement rather than enrichment. Resistance to management-driven waste monitoring organisational initiatives, because they are seen as disruptive and imposed, has been observed elsewhere (Lévesque et al., 2024). Importantly, since meanings attributed to the intervention were not aligned with waste prevention, no noticeable change was observed in chefs' behaviours or their professional practice.

Warde (2005) argued that the creation of shared meanings, a fundamental requirement of practice theory, could not be met entirely because shared meanings depend on uniform transmission and interpretation. This became evident as the sub-practices across the operational domains of the food production and service cycle were analysed. Each sub-practice had a distinct shared meaning attached to it, which was not consistent with waste prevention (see Table 3). This might explain that, as an aggregate, the practice of food production did not initially include prevention of food waste as a significant operational concern. This reflects other studies, which showed that hospitality staffs' conceptions of food waste management are highly variable (cf. Chawla et al., 2025; Koiwanit and Filimonau, 2025; Martin-Rios et al., 2018; Pearson, 2024). This encompasses how waste is defined, whether it is seen as a preventable problem, and whether solutions focus on 'upstream' prevention or 'downstream' management (e.g. recycling, redistribution and energy recovery). It also became evident that the intervention, as presented at this stage did little to shift the meanings chefs attached to commonly accepted practices, and hence failed to provoke substantial change in behaviours. The findings resonate with previous scholarly work on related themes. For example, Alonso-Vazquez and Ballico (2021) argued that shared meanings emerged through and in relation to a sense of collective identity. Their study found that the sense of shared identification bolstered social support and positively influenced engagement with pro-environmental behaviours.

In the next phase of this intervention, human actors helped to mobilise the agency of their non-human counterparts. Reinforcement via staff briefings and one-on-one meetings to clarify the goals and the

Table 2
Meanings practitioners associated with the intervention at initial stages.

| Thematic focus of staff interpretation | Staff's comprehension of intervention | Example data | Implications of their interpretation of meaning |
|--|--|--|--|
| Purpose | This intervention concerned effective waste separation. | 'This [waste separation] is what the management wants me to do and I agree on doing it, so this is like a contract we made ... they pay me for do this, also to put all the waste in the right bins even if it's now this three bin stuff. I don't care if its <i>effective</i> or its <i>good</i> , I just do what then comes the order [sic] [from management]' (emphasis in original). (Sous Chef, Germany) | The bigger message about waste prevention was not recognised at this stage. |
| Resources vs. returns | The intervention involves a lot of extra effort and investment. | 'It [food waste] needs to be documented from start to finish, documentation – these guys are cooks, they are not scientists. If you really want to do it [waste prevention] properly, if you really want to do a kitchen from start to finish, in a full HACCP way, it takes a lot of time and a lot of energy.' (Head Chef, Germany) | The team were unable to see the value or benefit. |
| Authenticity | The intervention (via the new bins) was essentially a management tool to catch people out. | 'I think it's the fact that the waste is visible, it's visible to everyone working in the kitchen and anyone walking past it. I can see it, the Executive Chef can see it, he will ask questions straight away.' (Sous Chef, UK) | The intervention aimed at 'naming and shaming', and hence was viewed suspiciously. |

benefits of practice change, was used to engage practitioners with the initiative. In addition, internal memos were placed on staff noticeboards regarding the purpose of the change in practices. Moreover, televisions in staff cafeteria sought to reassure employees of the initiative's value using a catchy slogan – 'it's an easy win, use the right bin.' In essence, human and non-human actors together facilitated knowledge about the topic, and this helped to shift embedded meanings within routine food production practices. Consequently, staff began to express that food waste *prevention* as an organisational agenda had not really crossed their mind, and that the new bins had begun to alter their view.

The interaction between the constituent elements of a practice was evident, and new meanings began to emerge. The change in meanings laid the foundation for a gradual shift in practices directed towards waste prevention. Practitioners within but also adjacent to the kitchen

operations began to acknowledge the positive impact of preventing wastage. Table 3 below shows the contrast in meanings practitioners associated with operational practices at the pre- and post-intervention stages. It was evident that meanings associated with the practice (or an agent) were not static and could shift with time.

Specifically, the associated meanings, post-intervention, which were reflected in the emerging practices, suggested that the chefs and their colleagues had altered conceptions of the (waste generation) problem and of the value that could be captured or created through focusing on its prevention (see also Chawla et al., 2025; Lévesque et al., 2024). In many cases, inefficiencies that encouraged waste generation e.g. over ordering and overproduction to mitigate the risks of complaints could be addressed by changing organisational processes, such as improving forecasting or changing portioning routines. This resulted in 70-73% lower waste generation and improved cost performance in specific operational areas.

Importantly, value attribution was often tied to chefs' skills and competencies. Rather than being seen as an external, management imposition, waste reduction was increasingly viewed as an embedded part of their social practices, and thus within their own domains of influence. Engaging in this type of pro-environmental behaviour reified their professional skills and occupational competencies. This appears particularly significant in an occupational community where skills and competencies define members' professional identities and thus their status in the occupational (and organisational) group (Cooper et al., 2017).

Previous research by Klitkou et al. (2022) found that practices can change when elements constituting them do. The findings extend this argument and indicate that practice change based on materiality and competencies requires a corresponding change in shared meanings. The development of new shared norms can be prompted by a provocative intervention, such as introduction of a new (non-human) agent into existing practice. However, it would be wrong to assume that new shared norms will emerge organically or be embraced comprehensively. Non-human actors can act as powerful catalysts in prompting behavioural change, but reinforcement by human actors may be required to ensure these are embedded in organisational practice (de Visser-Amundson, 2022; Martin-Rios et al., 2018). As Reckwitz (2002) argued, human as well as non-human actors compete but also rely on each other for agency. Pro-environmental practice change therefore relies on concerted and continued force exerted by both.

Furthermore, competencies, encompassing chefs' knowledge and capabilities, are also worth consideration. As Hennchen (2019) argued, there are two levels to knowledge-based competencies in this type of organisational and occupational context. The first is practical knowledge pertaining to practitioners' skills. This level of knowing can be imparted through training. The second is meaningful knowledge, which is deeper, embedded and reflects professional values and ethics. Arguably, the intervention provoked a change by shifting shared meanings as well as meaningful knowledge, by highlighting the negative social and environmental impacts of food waste, and the benefits of preventing it through a bundle of strategic organisational initiatives. By extension, it can be deduced that for a new practice to supersede established ones, it is important to target all three constituent elements of practice. A change in one (in this case through a non-human actor), can be leveraged to drive change in meanings and competencies, thereby mobilising change in practice. This approach may be more effective than targeting shared meanings or competencies alone. In short, a holistic approach to provoking practice change is advocated. However, a seamless transition cannot be taken for granted, and the inclusion further nudges are likely to yield greater impact (de Visser-Amundson, 2022).

5. Conclusion

The findings highlight that practice change should be approached, in theory and in practice, as a longer process rather than a single

Table 3
Meanings attached to key food production and service practices (pre- and post-intervention).

| Operational domain | Operational practice | Meanings (Pre-intervention) | Example expressions and actions (Pre-intervention) | New meanings (Post-intervention) | Example expressions and actions (Post-intervention) |
|--------------------|----------------------------|--|--|---|--|
| Planning | Menu engineering | Often impractical | 'Cross utilisation ... ermmm ..., so it's very difficult to permanently cross utilise on all outlets, if somebody says yeah, we can do it, I am sorry, they are talking a lot of bullshit.' (Head Chef, Germany) | Feasible with some creative thinking | 'For buffet restaurant, we try and plan the menu so that instead of having 10 different items, you just have six but you just change what they are served with. The lounge, I will try and use one ingredient for three dishes, so that does come into play when we look at menus, definitely.' (Junior Sous Chef, UK) |
| Procurement | Bulk buying | Economies of scale are prioritised | 'So, we as a company tend to buy out of economics and out of logistics.' (General Manager, Germany) | Better control over quantities of food bought, frequency of ordering and range of choices | 'We standardise all products now, for example cheese. When I started here, we got like 7–8 types of cheeses, the cost of buying that was like £5000 a week. Now after I standardised, we buy only four English cheeses. Now it's coming to like £500.' (Assistant Head Chef, UK) |
| | Buying extra | Risk mitigation is important and embedded | 'The main chef in each of the three kitchens order supplies for their section only, adding a bit extra to cover all risks.' (Sous Chef, Germany) | | 'We want to go away from everyday ordering to order two times a week. If we do this on a daily basis, there is a risk of losing control. If you do it two times a week, there is more planning.' (Director of Operations, Germany) |
| Food preparation | Precooking | Prompt service is the primary goal | 'Sometimes they can overprepare and it's like well, you didn't need to chop that up, and it would have stayed another week, but now you've chopped it up ...' (Junior Sous Chef, UK) | Precooking as a waste control measure | 'I introduced smoked salmon here. Because we now buy salmon fresh, we smoke it when we need it and we don't smoke it when we don't need it.' (Head Chef, UK) |
| | Bulk cooking | Time saving underpins routines | Platters of fried eggs from the buffet ended up in the bin. Fried eggs tend to go dry quite quickly under buffet lamps and are therefore deemed unsuitable to be served. (Observation Log, Germany) | Operational efficiencies achieved through better demand and capacity management | 'We are selling it first – lunch as per chef.' That means we are able to control. And we club a few meetings together and say – you eating buffet. If it's less than 40, we say okay, put you all together, you eating menu in the restaurant. That controls my payroll, it controls my food waste because I only produce 1 times 150 instead of 100 here, 50 there, 20 there and so on. This is the way of effective dealing with food waste [sic]. (Director of Operations, Germany) |
| | Cooking surplus quantities | Risk mitigation is important and embedded | 'Say you are catering for 50 vegetarians, you can't say, we will cook 50 less meat portions, just in case! You can't take the risk.' (Director of Operations, UK) | Standard recipes as control mechanism | 'We have also got a measurement – 100 people, bowl of salad, how much you need to produce, only that much you produce. How many tins you need to open, how many bunches of celery you need to chop, the recipes we did for the staff.' (Assistant Head Chef, UK) |
| Service | Excessive portioning | Excess represents value for money | 'I have eaten in the hotel several times and I sometimes think that the portions are too big, but you still need to, due to the manager log book, guest complaints that there wasn't enough food on his plate ...' (Director of Finance, UK) | Use technology and cooking skills to create value alternatively | '[Using sous-vide] we have cut down on the amount of knifework we do. It's like the meatballs have already been made, burgers have already been made, steaks are precooked, fish has already been pre-portioned. With everything else, it comes in portion really.' (Sous Chef, UK) |
| | Service | Customer experience is a key priority | 'You need to have a certain look at the buffet, you need a full buffet with everything is on [sic] and the guests need to see it. ... If you arrive at 6.30 or 10.30, it doesn't matter, there must be a complete, full buffet.' (Assistant Restaurant Manager, Germany) | Pre-portioned buffet selection seen as value adding | Many food items placed on the buffet have been pre-portioned. From cheeses to fruit salad, muesli, vegetable crudités etc. (Observation log, Germany) |
| Waste Management | Food reuse and recycling | Redistribution is a proxy for waste prevention | 'Our bakeries have breads that are one day past its shelf life, so it cannot be sold as fresh bread, and that goes to feed animals. I do not see that as waste so much because it's all going back into the system and coming back in some way.' (Sous Chef, UK) | Focus on proactive, preventative measures to capture value | 'But it's definitely got a place, I would say its higher up the agenda than it's been ...' (Director of Operations, UK) |
| | | | 'From our food waste, they produce energy, say at the end, it's a cycle, there is a value behind ... in terms of environment and in terms of responsibility. I think we have a good way.' (Director of Operations, Germany) | | 'They [guests] are very happy to see it happening. So if you provide it, you will show yourself up as a responsible partner. Yeah, I think in Germany we have generally quite aware base of guests. I think they count on us as an enterprise to help them, show them ways on how they prevent waste and be environmentally responsible.' (General Manager, Germany) |
| | | | | | 'The pressure is not to waste stuff. And if you can prevent it, then it's better than dealing with the aftermath ... yes, if we can turn it into compost or whatever, great, but ideally let's not waste in the first place.' (Director of Operations, UK) |
| | | | | | 'From an engineering perspective, the digesters are being looked at by the procurement, but thinking about the meeting we are having today, it is all about handling the waste rather than reducing the waste ... it's all about, well that much waste it is, but instead of separating it and going to landfill, let's deal with it on site. So the focus seems to be at that end not at the beginning ...' (Head of Sustainability, UK) |

intervention point. Change in established practices demands reinforcement, which should come through multiple sources within the organisation's processes, structures and leadership. This can help to ensure that initiatives focusing on change encompass the three elements of practice – materiality (making sustainable behaviours viable in the work design and environment), competencies (drawing on and mobilising the skills, knowledge and capabilities of practitioners) and meanings (ensuring clarity and coherence concerning the collective goals and shared benefits).

The findings raise two further questions concerning interventions that seek to transform practice. The first concerns the relative importance of the three components of practices in driving change. Specifically, if practice emerges through interactions between human and non-human actors, across materiality, meanings and competencies, should they receive equal weight in the design and deployment of waste reduction initiatives? This remains an open question for future research, which may use field experiments to test the relative impacts of different intervention strategies. However, rather than identifying a definitive, generalisable model for practice change, the relative impacts may remain context dependent. Their respective impact may be shaped by the type of establishment, including its value proposition; for example, fast-food operations may benefit more from material and competencies-based interventions, above meanings, as opposed to luxury, gastronomic organisations that employ highly skilled professional chefs. The impacts of any specific practice component may also be determined by the skillset of the staff, and their capacity to innovate, reuse ingredients creatively, and to lead others in their work teams.

The second, related question, concerns the sequencing for the focus of intervention, on materiality, meaning or competencies. In the current case, the initial focus on materiality did not, by itself, prompt practice change. This could be explained by the lack of change in the meanings. However, it is reasonable to suggest that the introduction of the non-human actor, acted as a radical provocation, which prompted affective and cognitive reactions among practitioners, creating a pathway for reflection, and subsequently for change. Again, the efficacy of different sequencing of interventions may be assessed through experimental methods, though contextual and human factors among the practitioners are likely to influence the impacts of any specific configuration. Suffice to say, effective interventions will require a combination of measures that aim to address materiality, meanings and competencies to drive practice change in reducing food waste.

5.1. Theoretical implications

Within practice theory, materiality has a key role, and changes in the material dimensions of practices often shape how they are performed (see e.g. Katan, 2023). This study suggests that an initial focus on materiality in intervention design can have a provocative function, prompting reflection and critical assessment of the purpose and beneficiaries of practice. Through this process the meanings associated with practice are disrupted. Deploying materiality in this way can thus be theorised as a starting point to practice change. Importantly, new meanings are constructed and competencies (i.e. skills and knowledge) are mobilised in response to the change in the materiality of practice. To understand how practice change evolves beyond and in response to such disruption, it is useful to consider how related factors become entangled. This paper's findings point to a theoretical link between social practices and occupational (and place-specific, organisational) communities insofar as they promote and perpetuate pro-environmental organisational practices. More specifically, the data suggested that the impacts of the material intervention evolved into meaningful knowledge among members of an occupational group (i.e. chefs) or organisational group (i.e. chefs working in an operational unit) when it engaged their competencies (i.e. their skills and ability reduce harmful waste generation, save money, or make a positive contribution to sustainability etc.). Pro-environmental behaviour was seen as meaningful and became

internalised by practitioners (i.e. viewed as their responsibility) insofar as it came to express skills and competencies that were recognised as being of value in the context of this occupational/organisational group. The emergent theoretical proposition is that the requirements and affordances of belonging to the occupational/organisational community can be used to activate new practices and to embed practices among members or those aspiring to integrate into the social entity. These are conceptual themes to explore in future research on the dynamics of practice change within organisational and occupational communities.

5.2. Managerial implications

The findings of this study indicate that relatively small-scale, cost-effective interventions in the workplace can be used to drive pro-environmental practice change. More specifically, this work showed how an initial focus on materiality triggered reflection and critical debate among practitioners concerning work routines, waste management, and waste generation, within the organisational context. Moreover, the findings stressed that such a materiality-led initiative should be complemented by supporting activities, focusing on chefs' professional knowledge, skills and capabilities as a pathway to changing shared meanings concerning waste. Through these processes, practitioners can start to be aware of the drivers and benefits of addressing food waste across a range of practice domains, with the fundamental aim of shifting the focus from its management to its prevention.

5.3. Limitations and implications for research

The current study was conducted in a relatively short timeframe. Future research can adopt longitudinal case study and ethnographic strategies to track the longer lifespan of practice-focused interventions. This line of enquiry can evaluate the role and impacts of reinforcement, assessing the implications of focusing on different elements of practices.

This study's generalisability is constrained by small sample size and the focus on luxury hotels, but the insights are highly transferable, subject to contextualisation. The variation of hospitality and foodservice operations in terms of size, service design, experiential offering, staff (ing) characteristics and management structures means that attempting to create a generalisable model for pro-environmental behaviour change in this sector is inherently problematic. Contextual factors must be taken into account in the design of future impact-focused research, as management's approach to waste prevention is likely to be driven by the specificities of the place, people and localised practices.

As noted above, future research may adopt quasi- and field-experiment strategies to assess the relative influence of focusing on different practice elements, and their sequencing. This would be particularly applicable for studying multi-unit organisational contexts, such as the corporate settings studied here, where specific procedural and structural features can be controlled for. However, given the importance of small and medium enterprises in the hospitality and foodservice sectors, using experimental strategies in sequence with inductive qualitative techniques could help to identify good and poor practices. Combining case study, ethnographic and experimental approaches could help to expand the evidence base beyond behavioural intentions to help understand the processes, trajectories and outcomes of interventions aimed at practice change.

CRediT authorship contribution statement

Gaurav Chawla: Writing – original draft, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Peter Lugosi:** Writing – original draft, Supervision, Project administration, Methodology, Formal analysis, Conceptualization.

Implications for gastronomy

The findings of this study show how a package of small-scale interventions in the workplace can be used to drive pro-environmental practice change to reduce food waste. The introduction of a new type of refuse collection, replacing larger food waste bins that were located away from the kitchens, with smaller, transparent containers positioned by individual work stations acted as a disruptive trigger for reflection among chefs concerning work routines, waste management, and waste generation. This initial focus on materiality was complemented by supporting activities, including briefings and internal communications, which sought to clarify the purpose and benefits of this initiative. Beyond the material environment, focusing on chefs' knowledge and capabilities throughout this intervention helped to change shared meanings concerning waste. Through these processes, chefs and associated personnel became increasingly aware of the drivers and benefits of addressing food waste across a range of functional areas, with the fundamental aim of shifting the focus from waste management (e.g. through reuse or disposal) to its prevention. This study thus helps to understand the processes and mechanisms through which practice change can be facilitated through workplace intervention strategies. Adapting and adopting these strategies in other contexts can help reduce food waste, which has positive financial and environmental implications for the organisations and a wider set of global stakeholders.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ijgfs.2025.101126>.

Data availability

The data that has been used is confidential.

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