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‘Kaleidoscopic gazing’ techniques: the practice of creative data analysis innovation

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Abstract
This article offers new insights for researchers wishing to practically analyse qualitative data both manually and creatively. Drawing on a longitudinal, constructivist grounded theory PhD study about students’ transition experiences from Further to Higher Education, the article offers the innovative model of ‘Kaleidoscope Gazing’ to provide an account of how complex datasets might be puzzled through and, as such, augments current approaches to grounded theory. The kaleidoscope metaphor is a fresh way of considering social phenomenon and can be used as a tool for grasping the complexity, ambiguity, and fluidity of individual’s situated experiences in multifarious contexts. It facilitates the piecing together of patterns of similarity and difference in the reported experiences of participants and helps to ‘visualise’ the myriad of factors affecting their worlds. Manually working with complex datasets offers new ways of perceiving connections within them and affords more nuanced and deeper understandings. This model is intended to be used as a training tool for both novice researchers seeking guidance about how to understand and analyse their qualitative datasets, and those more experienced researchers looking for alternative avenues through which to explore their data in more depth.

Keywords Kaleidoscopes · Qualitative research methods · Qualitative data analysis · Innovation · Research practice · Reflexivity · Grounded theory

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1 Introduction

Conducting and interpreting demanding and complex sociological research can be difficult, even for seasoned researchers, and this paper offers clear guidance about an innovative approach utilising the metaphor of a Kaleidoscope. Kara (2020) states such metaphors can be useful when disseminating complex research, and Graybill (2025) concurs, arguing that kaleidoscopes are a powerful metaphor for scholarly thinking. Indeed, Braun and Clarke (2022) use the analogy of a coiled hose when describing the process of qualitative data analysis, specifically thematic analysis. That it is like following a hose through long grass where, at times, as well as moving forwards, you might also have to coil back on yourself when iteratively returning to datasets for example. Urquhart (2022) and Lincoln (2009) concur, calling qualitative data analysis a messy and iterative process that is both complex and multifaceted. There are numerous social science texts and articles available which offer guidance on data analysis techniques and processes. Selecting a fruitful data analysis approach for any qualitative research, however, can be confusing and challenging especially for the novice or early career researcher. As Hammersley (1992:183) contends, "the research process is more like finding one's way through a maze." This article deliberates some of the foundational processes of grounded theory (GT) (Strauss and Corbin 2015) namely reflexivity, theoretical sampling, constant comparison and memoing to explain why these practices are crucial analytical processes in GT. How to practically implement these processes, effectively 'do' them, is explicated for newer researchers through illustrative, concrete examples, showing ways to engage with and analyse data generated via qualitative methods. Ghazinoory and Aghaei (2024) would argue this is timely, given there is currently little guidance or instruction on how to 'do' metaphor-based research and its validating principles.

We reflect on and examine how an innovative approach to data analysis was developed and, in doing so, demonstrate its distinctiveness and transferability. Whilst other studies have explored thinking through the lens of a kaleidoscope (Flis and Piotrowski 2024; Graybill 2025; Jopling et al. 2025) we argue that the development of 'Kaleidoscope Gazing' is both innovative and creative as methodological analysis. The enticing glints of information hint at deeper, more nuanced knowledge than perhaps more traditional ways of data analysis provide and this, arguably, is the treasure all researchers seek, irrespective of their levels of experience. There are also calls for further studies (Graybill 2025; Sergeeva Ninan & Oswald 2022; Lê and Schmid 2022) that investigate how scholars innovate other types of methods, to encourage more origination in the actual practice of research method approaches.

A specific example from educational research is provided in this article to exemplify this data analysis innovation. This emanated from PhD research in education pertaining to twelve students' transition from a Further Education college to their first year at university (Beckett 2021; 2024). Telephone interviews were conducted at the start of each student's course, halfway through and at the end of the first academic year at university. Each iterative conversation added to the pattern of their lives through their ontological narratives (Somers 1994), like shafts of light; illuminating epistemological understandings of how these individuals experienced being at university. We constructed meaning from their emic experiences as we iteratively interacted with the data commensurate with grounded theory (Glaser and Strauss 1967) based on the belief that knowledge is generated inductively.

1.1 The application of grounded theory

Grounded Theory (GT) (Glaser and Strauss 1967; Tarozzi 2020) is a long-standing method in qualitative research as well as being meta-theoretical. It does not endeavour to test theories or hypotheses, but rather the purpose is to create concepts and categories - and theory - from the data generated. Theoretically the researcher has no pre-determined philosophies, as GT starts with pure data, therefore the creation of emergent theory is informed only by data collection. Annells (1997) purports that GT offers a qualitative approach rooted in ontological critical realism and epistemological objectivity. That the goal of traditional GT is to discover a theory that explains a basic social process, such as in the case of this study. For the newer researcher however, these terms can be confusing. In this article ontology is understood in relation to how new undergraduates experienced going to university, the 'being' of becoming a student at this level of study. In other words, their 'ontological worlds.' Epistemology is the subsequent knowledge both they, and the researcher, gains from understanding these lived experiences.

Creative data analysis methods originate from GT approaches (Strauss and Corbin 2015), whereby the participants' data are interpreted by the researcher to construct understanding of their emic experiences. The interactive and iterative process of revisiting and playing with the data in visual ways utilised a constructivist approach to data analysis that Charmaz (2000; 2008; 2014) advocates. Whereas GT starts from an inductivist perspective, the benefits of using the creative methods this article suggests are the ability to move beyond induction to think imaginatively when interpreting studied life. As Charmaz (2009: 138) states: "We adopt inductive logic when we engage in imaginative thinking about intriguing findings and then return to the field to check our conjectures."

Hitchcock and Hughes (1995) state that the ability to recognise what is important in the data and give it meaning is theoretical sensitivity, which is further developed, they argue, through continual interaction. Constant comparison and iteratively re-visiting data are underpinning principles of GT, which Kilpinen (2009) argues breaks the habit of perception, making the researcher rethink and re-evaluate what they thought they knew. Additionally, Glaser (1978) purports that theoretical sensitivity helps to formulate theory that is faithful to the reality of the phenomena studied. Charmaz (2008) acknowledges theoretical sampling involves gathering new data whilst the researcher simultaneously analyses findings. Furthermore, that it offers precision and clarity to coding if the researcher lets the theoretical codes 'breath' through the analysis, not be applied to it. Utilising theoretical coding sparks new ideas to pursue she argues and indeed each new code helped to formulate the next questionnaire and interview for as Glaser (1978) argues, theoretical codes must earn their way into GT.

1.2 The analysis of qualitative data

Some authors regard qualitative data analysis as an on-going process (Olmos-Vega et al. 2023; Adler 2022; Braun and Clarke 2022). Although data analysis is often presented as a series of stages, the activities of collecting information, generating data, sorting, and formatting this into categories, and creating a particular story through writing the qualitative text, arguably, occurs simultaneously. Additionally, qualitative data analysis is fundamentally a subjective, interpretive, eclectic, and iterative process (Ribbens & Edwards 1998); there is

not necessarily one right way of doing it, although there are more fruitful ways than others. Graybill (2025) states that the kaleidoscope's shifting perspectives help remind researchers to maintain clarity of vision and reflection whilst interpreting phenomenon. Indeed, using the lens of a kaleidoscope aided reflexive thinking around our own subjectivities as the manual analysis of the data encouraged consideration of the primary role we had in terms of shaping it. Confronting our own biases, assumptions and beliefs facilitated this reflexive thinking and helped mitigate the impact our own philosophy, beliefs and feelings might have had on the research process and outcomes. This inductivist approach, whereby theories around student transition were constructed, is commensurate with GT (Strauss and Corbin 2015).

Some qualitative researchers favour using computer software programmes such as ATLAS.ti™ and NVivo™. Woods et al. (2016) found that researchers typically use these tools for data management and analysis which, they contend, provide greater transparency of analytical processes. Brinkmann (2012) however suggested the rise of CAQDAS evokes the *control* element of McDonaldization - non-human tech outsourcing of skilled tasks - and we see elements of *control* and even *predictability* in the potential "shutting down" of options in qualitative researching to produce a quick result. We rejected the use of CAQDAS in this study for these very reasons. Having provided a brief review of relevant literature, we introduce the study's design and methodology to contextualise the 'Kaleidoscope Gazing' approach.

2 Research design and methodology

The 3-year longitudinal study (Beckett 2021; 2024) explored students' experiences of attending Further Education (FE) through two years of A levels in a college located in the English Midlands. Twelve students subsequently elected to continue with the research beyond FE into the third year of the study. There were three males and nine females, all white with one female having an immigrant background. Pseudonyms were utilised for these twelve participants who all hailed from what is considered a traditionally working-class area in England. The range of Higher Education (HE) courses they were enrolled on were disparate. One of the article's authors was also one of their A level teachers, conducting what BERA terms 'Close-to-Practice research' in the classroom (Wyse et al. 2018) during the first two years and then, in the third year of the study, tracking the twelve participants during their first year as undergraduates.

2.1 Method

For the PhD research (Beckett 2021; 2024), the data collection process (when the participants were in their first undergraduate year) followed an inductive, GT approach whereby it evolved through creative engagement with what was occurring rather than any preconceived notion. Such involvement led to increasingly innovative ways of handling it. Charmaz (2008) states that emerging theories can indicate needing more than one type of data and can incorporate more than one type of analysis. Manual immersion in the data facilitated open coding (Strauss and Corbin 2015), whereby there were no fixed ideas regarding the data. This is commensurate with GT (Glaser and Strauss 1967) based on the belief that

knowledge is generated. As Charmaz (2014) states, codes are created by defining what is seen in the data. This piecing together of the participants' experiences was axial coding (Strauss 1987) where large amounts of data were being sorted, synthesised and organised and then reassembled after open coding. Thus, providing an analytical frame for the data, as Charmaz (2008) suggests, which was a necessary step in gaining the overall picture of their lives. The constituent parts began to fit together to create a 'vision' of their ontological worlds, however whilst the picture was building, it was only a snapshot at that given point in time. This approach did however afford constant comparison of the data set on two levels: explicating the bigger picture of student transition from FE to HE, as well as the individual pieces of data that comprised each participant's experiences.

Whilst Charmaz (2014) regards axial coding as optional and highly structured, coding in this way aided better data interpretation as it enabled us to see connecting patterns across the data. Strauss (1987: 64) sees axial coding as "building a dense texture of relationships around the "axis" of a category". Glaser & Holton (2023 p.5) argue that theoretical codes preclude the need for axial coding because they "weave the fractured story back together". Applying both types of coding however, we believe strengthened this constructivist GT approach (Charmaz 2008). Having started with reductive, quantitative data, visually and creatively coding this way allowed us to piece the story back together to establish the whole kaleidoscopic pattern.

Arguably this suggests that creative data manipulation can facilitate deeper immersion than computer-assisted qualitative data analysis software (Morgan 2023; Asogwa et al. 2024) and therefore offer greater understanding. This is commensurate with Lê and Schmid's (2022) concept of innovating methods holistically, as the 'Kaleidoscope Gazing' approach this article presents. Lê and Schmid (ibid.) argue that all elements of research design are inter-connected, rather than separate from each other, which tumble throughout the entire research process resulting in originality; much the same way as the cascading glass elements behave in a kaleidoscope. Every new conversation twisted the kaleidoscope dial throwing new light on the participants' ontological experiences. As Graybill (2025) acknowledges, every slight turn of the dial creates a totally different pattern from the same components. This demonstrates how researchers originate methods by progressively fashioning and applying innovation in many parts of the research design (Lê and Schmid 2022).

Similar to Braun and Clarke (2021), NVivo was rejected in this study as it led to feelings of detachment from the data, affording less immersion and therefore less insight (Beckett 2021). Manually working creatively with the data can, arguably, afford new ways of perceiving it and facilitating connections within in it, explicating patterns. We found 'Kaleidoscope Gazing' led to "flashes of insight" (West 2023 p.250) when one's mind wanders (Reichertz 2007), allowing us to consider, in more nuanced depth, the significance of the knowledge we were constructing from the data. This awareness presents reflexive ways to consider and interpret the data commensurate with GT. As Mauthner and Doucet (1998 p.122) acknowledge:

In analysing our data, we are confronted with ourselves, and with our own central role in shaping the outcome. Indeed, perhaps this is part of the reason why computer programs have been so popular: the use of technology confers an air of scientific objectivity, onto what remains a fundamentally subjective, interpretive process.

We argue that whilst we acknowledge GT traditionally offers a qualitative approach rooted in ontological critical realism and epistemological objectivity, the application of the

'Kaleidoscope Gazing' method yielded greater epistemological insight into our participants ontological understanding of being at university. That in this way it both aligns with, and even advances, the paradigm of GT.

2.2 Telephone interviews

Telephone interviews were conducted at the start of the first undergraduate year and then subsequently during each of the following three semesters. The intention was to elicit rich, in-depth data (Unnithan 2021), such as the participants opinions, aspirations, and apprehensions. As such, questions were individually tailored to each individual dependent upon the previous semester's information. The intention was to bring the researcher closer to the perspectives of the research subjects (Denzin and Lincoln 1994). Data were triangulated with that gathered during years one and two. Participants consented to interviews by email and interviews were recorded and manually transcribed affording greater familiarity with the content and stored electronically in accordance with the University's ethics policy.

2.3 Methodological innovation

This article offers new ways in which to analyse qualitative data. Other studies have also considered innovative approaches in relation to qualitative data analysis (Mannay and Timperley 2025; Kara et al. 2024; Khoo 2024). Kara (2024) argues creative research methods can support and augment research throughout all stages of the process. However, even those employing creative methods may, at times, reflexively examine themselves. Doucet and Maunthner (2008) for example question the extent to which we can build connections with participants with whom we may only share ephemeral research relationships. They also consider the extent to which we can ever be epistemologically certain of our understandings in relation to our research subjects. Their 'Listening Guide' approach suggests that we can never really fully know their 'truths;' that their ontological narratives (Somers 1994) are temporal and in flux as they create their identities and selves. Arguably, there remains a hidden part of themselves, something "beneath," "behind" or "beyond" (Stanley 1993: 209) their narratives. Charmaz (2014) concurs, acknowledging much remains tacit; much remains silent. This necessitates constant reflexivity (Dean 2017) or what Bourdieu termed epistemic reflexivity (1998), resonating with Lê and Schmid's (2022) ideas about documenting and writing about relationships between researcher and research subjects. One of the article's authors was also the participants' teacher, thus an 'insider' (Chavez 2008). This was advantageous in comprehending the intertwined nature of theory and method as advocated by Lê and Schmid (2022).

Doucet and Mauthner (2008) purport such relationships are in a constant state of ontological fluidity, subject to endless interpretation as later iterations of the original listening guide testify (Doucet Jewell & Falk 2025). Arguably this points to a need for ever-evolving creative ways in which to capture and chart such movement, such as the 'Kaleidoscope Gazing' method affords. Working creatively with data in this way provided tantalising and illuminating glimpses into the participants lives; whispering suggestions of patterns and glints of perceptions that tempted us on with the promise of being fully explicated. Data analysis became exciting and beguilingly revelatory. Whilst we accept Doucet and Mauthner's (2008) claim that we cannot ever fully know our subjects, we argue that the method-

ological approaches taken in this article **do** afford a peeking into the "beneath," "behind" and "beyond" the participants' testimonies. We promulgate this approach should be used however in tandem with reflexive thinking as meaning is created from the data.

Being reflexive it not a skill that comes naturally however, especially for a novice researcher. Turning the lens upon oneself involves reflection, introspection, and critical self-analysis during the research (Basit 2010) facing truths about ourselves that we may prefer to avoid. Furthermore, the researcher may question themselves about the extent to which their reflexivity is effective as total reflexivity requires uncompromising self-reference (Davies 2012). Such self-scrutiny can be uncomfortable, even for seasoned researchers. This is why it is so important to keep records, notes, and memos (Pillow 2010) which enables researchers to examine how one's own views and assumptions might have affected data interpretation. As Charmaz (2014: 17) states "we *construct* our grounded theories through our involvement with people, perspectives and research practices.'' Doing so, Charmaz argues, fosters researcher' reflexivity about their actions and decisions.

Mapping each carefully considered code to a shard of glass on the kaleidoscope template aiding reflexive thinking, creating clarity within the coding process. The light and mirrors associated with kaleidoscopes offered a transparency that illuminated students' ontological narratives (Somers 1994). Just as one cannot negate the image they are faced with upon gazing into a mirror, nor can one refute participants' ontological perceptions of their worlds once refracted through the lens of the kaleidoscope.

> When a kaleidoscope is held to the light, it is the light that brings the patterns together. Individual and communal reflection enables us to see these patterns and designs more clearly. (Sisters of Charity Healthcare Systems1992 cited in Baker 1999: 38).

We argue that the innovative methodological approaches taken forged closer relationships between researcher and participant, eliciting thick, rich data Geertz (1973) that deepened our epistemological understandings. This would likely not have occurred without the 'Kaleidoscopic Gazing' methodological approach, which illustrates how the increasing awareness of what was occurring through data interpretation afforded fresh, reflexive ways to consider it. We draw on concrete examples to illustrate how data were analysed and thus provide guidance as to how such data might be handled.

2.4 Coding

Manual immersion in the data facilitated open coding (Strauss and Corbin 2015). Small segments of the data in the transcripts (words, lines, sentences, and paragraphs) were analysed line by line to identify words or phrases that seemed important and ascribed an open code (ibid.). Words relating to emotions linked back to friends (or the lack of) whilst comments regarding their academic progress were associated with their studies. Two clear themes emerged at this stage that could be separated into social and academic factors the participants were experiencing. Socially for example, one participant said,

> I wasn't one to socialise well before but now, since coming to uni, I've become a social butterfly, just swimming in and out of different groups which I'm really enjoying.

Another exemplified the difficulties adjusting to the academic side of uni life,

> Essays and assignments? Yeh, I hate them, it's hard to know what you need to know because at college we were told what we needed to learn. At college, they gave us a book and everything in that book was what you needed to know, whereas at uni it's not like that. And referencing? I just don't have a clue about it, it's just baffling.

Over a hundred different codes were generated such as 'dropping out,' 'belonging,' 'friendships' and 'assignments' for example. The participants' initials were recorded by their comments, so it was clear to the researchers who had said what, and at which data collection point. The comments quickly grew per code as patterns evolved and data needed revisiting this time using axial coding (Strauss 1987; Strauss and Corbin 2015) to establish connections between codes to create new patterns and themes. For example, all responses about lecturers were cut from the original transcripts, colour coded and collated on A3 sheets under that code. Positive perceptions of lecturers were highlighted in pink whereas negative perceptions were highlighted in blue (Fig. 1). Doing so explicated what patterns were emerging across the data and at what stage of the data collection process they were captured, for example, DCP2 (for data collection point 2). Simultaneously the researcher's own thoughts and interpretations were reflexively recorded next to the comments as meanings were constructing from the data and codes further refined: such memoing is what Mauthner and Doucet (2003) call 'doing reflexivity'. Furthermore Charmaz (2014) argues that iteratively revisiting notes, memos, transcriptions, and coding at different points of time, and from different perspectives, is crucial method in GT. Doing so can offer previously elusive insights and uncover deeper layers of meaning when subject to repetitive methodological processes (Timmermans and Tavory 2012). Thus, a perceptual change in the relevance of a phenomenon over time can occur; it is no longer taken for granted as researchers are forced to be reflexive about their own interpretations of the data and the subsequent implications (Charmaz 2014).

It was important to record who said what and when for two reasons: firstly, to establish a timeline regarding how each participant's thoughts were changing regarding their ontological experiences, which could then be tracked back across their first undergraduate year. Sec-

Interviewer: what does a 'good' lecturer mean to you?	**Notes & codes**
PP: Someone approachable, more willing to help. Some are so nice and go through things with you like a college lecturer would. I have one lecturer who draws on her own workplace experiences, which is good as I can relate to her more. Others don't seem to care and will just tell you what part of a book to read, they don't clarify or help at all. They just expect you to know, and obviously I don't know, that's why I'm asking the question. They just shut you down and that's wrong. Next year I'm picking courses with better teaching staff!	DCP2 • Subjective • Pedagogical change • Relatability • Relationships • Support • Agency • Student expectations • Negative emotions • 'Better' teaching staff?

Fig. 1 Code of lecturers highlighted

ondly, to afford to a diachronic understanding of what changed over time and why. Coding continued until saturation point (Glaser 2001) when no new, fresh codes could be identified and all those that existed were subsumed into existing categories. The original transcripts were simultaneously (and iteratively), revisited constantly during this time, which allowed for further refinement of themes and also aided reflexive thinking about how the data were being interpreted.

Handling the data in this way facilitated seeing better connections across it. For instance, positive emotions (and negative emotions) were also experienced through other factors, such as relationships with friends and flatmates, or perceptions of academic grades. Making this link meant the codes needed subdividing, as Fig. 2 illustrates. Each new subdivided code was then allocated its own A3 sheet and sections of relevant transcripts collated onto the page.

Despite being a very necessary step in initially making sense of the data, using A3 sheets became unwieldy as data analysis became increasingly complex. The dataset demanded to be visualised in a more illuminating way.

At this stage each participant had a distinct pattern of codes and configurations regarding their social and academic experiences at each of the three data collection points. Students' experiences were messy, multifarious, and required a more expedient step to illustrate this. The idea of a kaleidoscope seemed pertinent, which metaphorically became a creative way to conceive their fluid, lived experiences, as Silverman (2024) argues, working with diagrams can help to conceptualise ideas and this was true when attempting to synthesise thick, rich data (Geertz 1973).

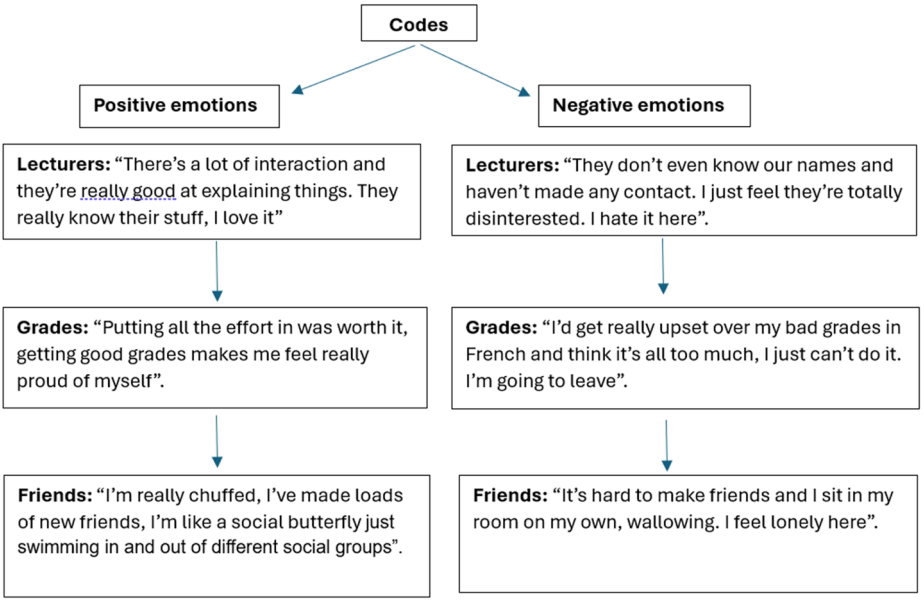

Fig. 2 Making connections across codes

2.5 Kaleidoscope Gazing

To cut across and drill further down into the data, the metaphor of a kaleidoscope better visually elucidated the lived experiences of students' ontological experiences. The use of metaphors forces us to confront our everyday experiences as unfamiliar, offering a deeper appreciation for it, or thinking of it in new and unfamiliar ways (Timmermans and Tavory 2012; Graybill 2025). Each code was mapped onto an individual kaleidoscope shard (Fig. 3). Colour codes remained consistent, for example pink continued to represent positive emotions. The shapes were deliberately random and metaphorically represent the distinct differences between the participants' experiences.

Acetate pens and sheets replaced highlighters and A3 paper to trace kaleidoscope patterns until the completed template resembled a static kaleidoscope image at that given point in time. Each participant started with a basic kaleidoscopic template at DCP1, which became more developed at DCP2 until the complete picture emerged at DCP3. Ultimately every individual had a unique picture of distinctive patterns representing information from each of the three data collection points across the year. Laying these acetate sheets on top of one another blended the pattern of social and academic factors together. This process made it possible to chart visually, by comparison and over time, how their lives had changed since the last telephone interview. When all twelve individuals' kaleidoscopes were completed for each of the data collection points, it became possible to assess the images to establish emerging patterns of similarity and difference, much like the turn of the wheel on a real kaleidoscope. These patterns were compared until once again saturation point was reached (Glaser 2001). Each iterative conversation throughout the data collection period added to every individual's unique kaleidoscopic pattern at that given data collection point, illuminating new understandings of the extent to which their patterns of acting, thinking, feeling and being (Maton 2005) had changed since the last discussion. To clarify, the steps followed are shown in Fig. 4 below to help other researchers operationalise the process in practice.

2.6 Ontological justification for kaleidoscope gazing

The kaleidoscope metaphor is a useful, fresh way of considering student transitions, a tool for grasping the complexity, ambiguity, and fluidity of individuals' experiences throughout their transition from FE to Kara (2020) acknowledges creative methods, such as the use of metaphors, can be particularly useful for disseminating complex research. Just as the wonder of the kaleidoscope lies in the ever-evolving patterns it creates, so each individual's experiences constantly shifted and changed, dissolving and reforming to create order out of chaos. Each data collection point was an opportunity to examine the pattern and colours in their personal kaleidoscopes, created by their latest experiences, interactions, and relationships with others. Combined with decisions taken, life's vicissitudes or serendipitous occurrences, these factors informed their ontological reality. For every interview, the pattern changed, allowing the image elements of their lives to converge, destabilise and reform, making their individual kaleidoscopic patterns more distinctive as they sought to make sense of their new lives and identities being forged as an undergraduate student. Even when students shared similar ontological experiences, the way in which these were perceived were different, just as the kaleidoscope offers infinite combinations of imagery

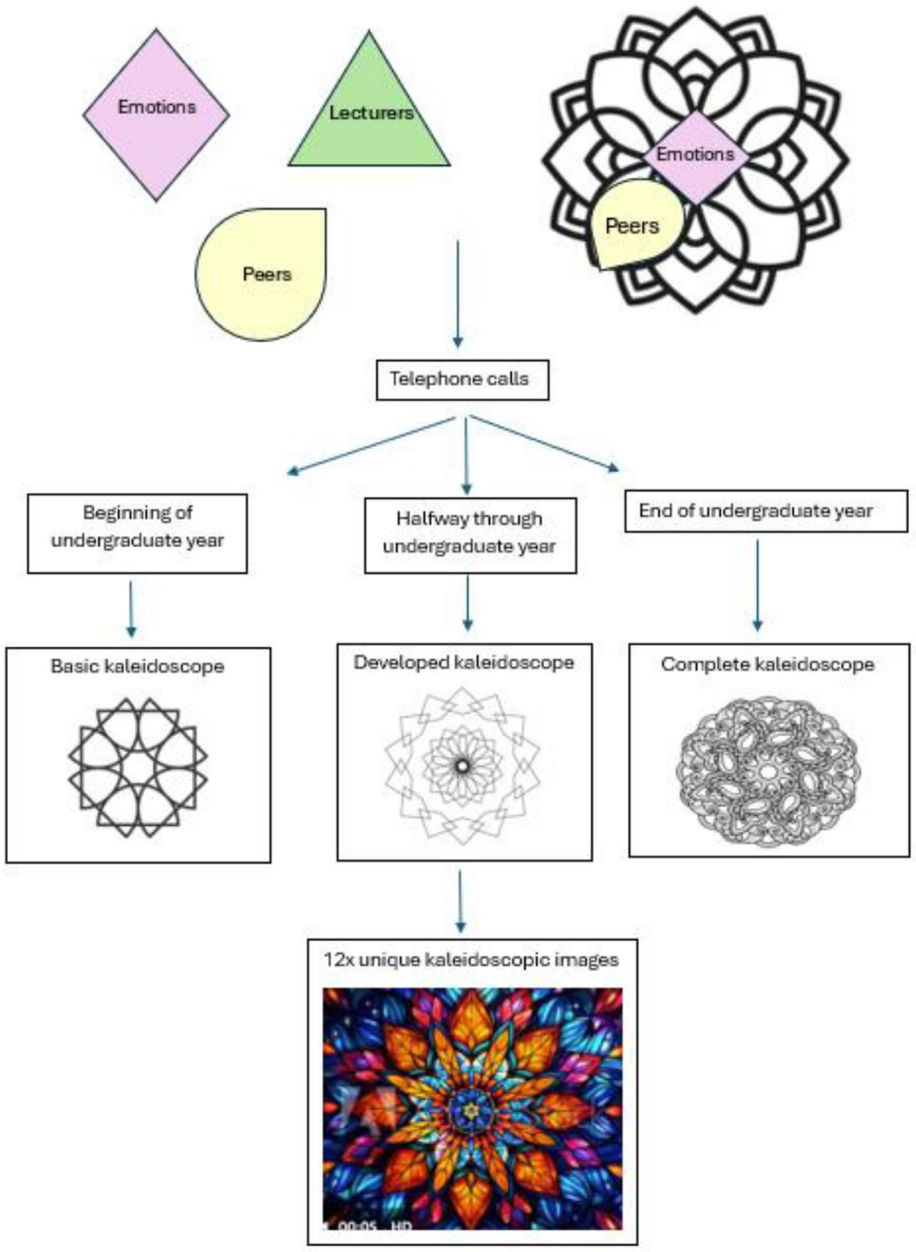

Fig. 3 Kaleidoscope Gazing

where no two patterns are the same, so no two students will ever interpret an experience in the same way.

Baker (2002 p.15) notes, "Kaleidoscopes are portals of remembrance that open onto the familiar, yet unexpected." So, arguably, whilst the 12 students' lives and characters

Step 1. Coding. Manual immersion in the data facilitates open coding, whereby the researcher has no fixed ideas regarding the data.

Step 2. Colour coding. Where responses were cut from original transcripts, colour coded and collated on A3 sheets under that code.

Step 3. Acetate layering. Where acetate pens and sheets replaced highlighters and A3 paper to trace individuals' kaleidoscope patterns at each data collection point. Layering these sheets on top of one another blended the pattern of social and academic factors together over time to create a fuller kaleidoscopic picture.

Step 4. Saturation point. Where kaleidoscopic patterns are compared until no new, fresh codes are identified, and all those that existed were subsumed into existing categories.

Step 5. Pattern comparison. Where students transition trajectories are charted over time to see kaleidoscopic patterns of similarity and difference between them and visualise the multitude of factors affecting their worlds.

Fig. 4 The process

remained familiar due to the nature of our established relationship and the knowledge they had offered during the data collection stages, pattern alterations were occurring in the fabric of their lives. These changes were sometimes because of critical incidents with far-reaching consequences, such as a complete change of course, unexpected serious health issues or breakdowns in relationships with friends, family, and partners. Others underwent more subtle and nuanced changes, such as doubts about their own academic abilities when comparing themselves to peers, for example. These were no less important to those involved, however. Whether critical or subtle changes, the move to university and its associated experiences triggered a reflexive consideration of whether, for some individuals, they ought to continue at all with their studies. Several of these changes were instigated by the choices or decisions made by the participants, for example, the decision to remain at home whilst studying. Conversely, another participant had made the decision early in the first semester to move back home due to feeling homesick initially but over time came to regret this decision. Other choices focused on module selection contingent on who were considered the 'best' lecturers, or who to be flatmates with, for example. In such cases the kaleidoscope analogy illuminates how students consciously shift and move the facets of their lives around to create the mosaic that they believe at the time best fits their life's circumstances, needs, and wants. Middleman and Rhodes (1985 cited in Baker 1999 p.40) elucidate:

> The pattern may pop into a totally new arrangement as we notice and manipulate it ourselves. This is a world where fluctuations are central and change moves from disorder to higher levels of order. Recurrent random fluctuations lead to order through selective choice, a new order out of chaos.

In other participants' cases, life's fluctuations, or opportune circumstances beyond the control of some also turned the wheel of the kaleidoscope, and therefore the pattern of their lives. One, for example, won a prestigious film award for a short documentary he had made on his course which served to reinforce his choice of media career path. Similarly, another,

was one of six law students from her course selected from a highly competitive field, to attend Lincoln's Inn, a prestigious London court. They divulged:

> There was a QC there on the Queen's bench and he was having quite a heated debate with me about the James Bulger case 'cos he was on the parole board at the time, and he just turned round and said, "do you know what, I think you'd make a great barrister." I said, "do you, why"? and he said, "'cos you just sat there and told me how a few things are, I've said 'no,' and you've carried on fighting your corner" and he said, "best of luck" and then he went off. It did really boost my confidence.

This little exchange illuminates how her feelings about becoming a Barrister were positively altered by an influential figure in the field. Her career path is one of many documented in Beckett's (2024) book. The dialogue shows how, irrespective of fate or agency, whatever the tumbling pattern of instabilities and fluctuations, we must keep seeking the shifting meanings, the patterns that reoccur, albeit in new configurations as Middleman and Rhodes (ibid.) remind us.

On peering into the kaleidoscope no other researcher would have perceived the same configuration of patterns as this research was conducted from the unique positionality of the researcher (Beckett 2021). The way in which the data were interpreted was also inimitable of a given positionality and subjectivities. So, to some extent, this is a personal construction, reflecting the researcher's values, understandings, and perceptions. As Morison (1986: 56) purports:

> Sociological research is a complex enterprise involving a dynamic interplay between personal values, theories and practical data gathering skills. Different sociologists, looking at the same community but not starting from the same theoretical viewpoint, may direct their attention to different aspects of the place they are studying and come up with extremely contrasting results.

Taber (2013) argues that appreciating each researcher has their own positionality does not compromise the account. He argues that during interviews, the researcher is an intimate part of the data construction, and it is neither reasonable nor desirable to believe another researcher would have elicited the same information. Although the study could be replicated in a similar environment, following the same procedures, given the natural setting of this particular research it would be impossible to duplicate the same results. The participants would have different transition experiences and "a different researcher, or the same researcher in a different frame of mind, might write a different report from the same data" (Brown 2010: 238). For this reason, absolute reliability cannot be guaranteed which is openly acknowledged. However, as Morison (1986) contends, this does not compromise the validity of the data generated.

3 Discussion

The 'Kaleidoscope Gazing' approach illuminates new ways of perceiving data which highlights the value of employing creative methods, especially for the newer researcher. Inventively 'playing' with simple, child-like materials using coloured pens and cellophane to 'colour in' templates whilst coding ironically yields great depth of knowledge. Highlighting and cutting and pasting the data together better illuminates the patterns and connections within, as it is visualised through evolving levels of sophistication. Approaching data analysis in this way can help all researchers operationalise reflexivity as they more deeply consider the choices they are making whilst coding, and the meaning they are constructing whilst doing so. Being actively engaged in the process leads to a series of decisions such as 'how' and 'why' we handle data in particular ways that must be justified in a doctoral thesis or journal article. Processing these decisions about what to include, remove and how you interpret what remains takes deep consideration (and time) afforded by manual data handling. The ensuing qualitative narratives researchers tell from the choices they make can say as much about who they are, their own assumptions and contexts as those they report on. This is why constant reflexive vigilance must be maintained, and this article demonstrates how the concepts of GT, reflexivity and constructivism become concretised through the application of 'Kaleidoscope Gazing.' These can remain abstract theoretical terms for the novice researcher who may understand the basic principles, but not how to operate, implement or know how to incorporate into their own research.

The depth of epistemological understanding of the participants transitions, as well as clarity regarding their ontological experiences, would not have been reached without using 'Kaleidoscope Gazing.' Admittedly this became a time-consuming process, requiring total absorption with the data to truly appreciate its nuanced depths and connections. It was, however, both necessary and evolutionary in the search for deeper understanding of the participants' experiences. Using the basic kaleidoscope framework intuitively led to the development of increasingly sophisticated iterations to visualise the data, which are unique to the researchers and allowed theories around student transition to emerge inductively, discussed in Students Transitions from Further Education to University (Beckett 2024). It is intended that the 'Kaleidoscope Gazing' method inspires others to approach their data coding creatively to help better understand both open and/ or axial coding.

The 'Kaleidoscope Gazing' method we offer encourages fresh ways of considering and interpreting complex qualitative data. It also allowed us to contribute to the field of knowledge regarding psychosocial experiences, as all the participants offered inimitable insights into how people like them manage a myriad of emotions as they experience going to university. Reay (2015) acknowledges this is an area worthy of further research. Furthermore, innovative methods can generate powerful new theory argue Lê and Schmid (2022). This was true of this study, which provided compelling evidence of the types of qualities and characteristics individuals possessed that led to successful (or not) transitions into HE (Beckett 2021; 2024). The ability to visually track students' transition trajectories over time, through the pattern comparison 'Kaleidoscope Gazing' afforded, facilitated deeper theoretical understandings on many levels. These included how students' identities were developing in response to the new social and academic factors they were experiencing. In turn, how academic tasks affected their feelings of self-efficacy, and the sense of 'belonging' to their respective institutions. Integral to this are communities of practice, the more experi-

enced others in the field who help to integrate and orientate inexperienced students into their new worlds. The method afforded fresh knowledge regarding the types of coping strategies undergraduates devise to enable them to cope with being at university. These included, for example, setting strict study timetables, preparing questions in advance of tutorials, practising writing exam papers and finding suitable places and spaces in which to study. In many cases these were new agentic, behavioural changes for those involved.

It became apparent that class was also a factor influencing how effectively new students adapt to the field of HE (Beckett 2024), as it governs the extent to which an individual can operate effectively (or not) and adapt successfully to this new environment. Arguably going to university is the norm for the middle classes (Reay et al. 2010), however this may not be the case for non-traditional, working-class individuals entering HE. Such theoretical insights contribute better understandings of how universities might best support new undergraduates as they settle into university life. Lastly, 'Kaleidoscope Gazing' led to the development of an increasingly complex and evolving set of theoretical student typologies that accommodated the fluid and changing positions of the participants throughout their first undergraduate year. These transitions from were more dynamic than initially anticipated, and can be used to explain transition from FE to HE (Beckett 2021), commensurate with GT.

This article intended to explicate a visual 'audit trail' (Lincoln and Guba 1985) of the new method utilised in this study, which may be taken and adapted by other researchers handling qualitative data. Lê and Schmid's (2022 p.329) refer to this as providing what they call "bite-size chunks" to help the reader assimilate the process. Arguable something a novice researcher may find more digestible. Breaking the data down in this way facilitates constant comparison, a 'talking back to the data' as it was generated to first process it, then construct understanding of it and ultimately make judgements about it. Revisiting notes and memos enabled an acknowledgement of personal biases and to become aware of how these affected the subsequent ontological and epistemological assumptions embedded within. Keeping meticulous records is crucial to the process and offers two-fold benefits. First, it enables other researchers to follow in detail the step-by-step approaches being suggested. Second, it enables the researcher to recall more accurately what they did, which in turn facilitates deeper reflexivity as they iteratively consider both their methodological approaches and the meanings they are constructing from data analysis. Combining clarity of methods with such reflexivity may lead the researcher to naturally 'pivot' their approach as data interpretation necessitates, i.e., agilely switch from one process/ technique to another, as GT requires, to accommodate the evolving demands of data interpretation: as demonstrated by the method of 'Kaleidoscope Gazing' approach offered in this article.

Employing reflexivity when considering transcripts and triangulating questionnaire data and classroom observations with peers were strategies used to manage potential areas of bias (Chavez 2008; Mills 2018). Dean (2017) argues this is why reflexivity must be employed when collecting data and its subsequent analysis. For example, the relationship built over time meant that the researcher knew the participants well and caught themselves inferring meaning from what was being said. As the participants were forming and forging new identities, both professionally and as HE students, it was paramount not to influence their thinking about their own positionalities. Informing them of the researcher's thoughts about them might have changed the way they perceived themselves. As Hoskins (2010 cited in Cole and Gunter 2010) points out it is therefore important to remain aware of reflexivity in accounting for the researcher's presence in the research process. This is at the heart

of constructivist GT approaches. As Charmaz (2014 p.321) states, "We stand *within* our research process rather than above, before or outside it." She argues that codes generated do not capture empirical reality but are instead the product of the researcher's view; that any conclusions drawn are merely interpretations which is why reflexivity is paramount. Furthermore, that seeing the research as constructed rather than 'found' promotes reflexive thinking about the researcher's actions and decision-making (ibid.). Fastidious record keeping aids the researcher to both recall their reasonings and justifications for data handling, as well as to explicate their approaches for others to utilise. Such a breadcrumb trail, which connects bits of information or evidence, helps piece together the whole and encourages the researcher to reflexively, and iteratively, consider the meanings they are constructing.

The meanings constructed from the data in this small-scale research were based on that of a single coder, based in a particular learning establishment. This renders it unique in its own idiosyncrasies, however this does not invalidate the account (Taber 2013). The researcher is an intimate part of the data construction, and it is neither reasonable nor desirable to believe another would have elicited the same information. Although the study could be replicated in a similar environment, following the same procedures, given the natural setting of this particular research it would be impossible to duplicate the same results. The participants would have different transition experiences and "a different researcher, or the same researcher in a different frame of mind, might write a different report from the same data" (Brown 2010 p.238). For this reason, absolute reliability cannot be guaranteed which is openly acknowledged. This does not compromise the validity of the data collected (Morison 1986).

The method of 'Kaleidoscope Gazing' also has the potential to be adapted for team-based research on larger, more complex datasets utilising CAQDAS, however would need to be trialled in this way. Subsequent data interpretation would be informed and constructed by the researcher(s) as research tools themselves (Mosselson 2012) as in the case of this project. Researcher collaboration would offer opportunities to triangulate interpretations, perhaps leading to deeper phenomenological insights than in the case of this article. Such cross-pollination of perspectives would improve the quality and rigour of the research and allow for perhaps even deeper reflexive consideration of the data. Given that this article suggests the 'Kaleidoscope Gazing' method might be used as a training tool, working with more experienced researchers would allow those less knowledgeable to develop their qualitative data analysis skills under guidance. Whilst the technique was used to consider student transition in this article, its usefulness as a tool could be adapted to a myriad of other qualitative research fields beyond that of education, for example healthcare or social policy contexts. The ways in which it might be expanded, developed, applied and utilised are hypothetically boundless, contingent upon the imagination of the researcher.

4 Conclusion

The 'Kaleidoscope Gazing' method is both an innovative and visually accessible way to interpret data and construct meaning from it. Furthermore, it renders complex theoretical concepts more 'graspable' and comprehensible to the newer researcher. In this way, much as a child becomes absorbed in play, so the researcher in their data, and greater, more nuanced epistemological understandings are constructed. This may also appeal to the more experienced researcher looking for alternate avenues to explore their data in more depth. The

framework demonstrates how utilising creative methods afforded a peek into the "beneath," "behind" and "beyond" (Stanley 1993: 209) into the ontological worlds of new undergraduates, in ways that we argue might not have been possible utilising more traditional methods. Whilst we concur with Doucet and Mauthner (2008) that we cannot fully come to know our participants, we argue this creative methodological approach helped us better understand them epistemologically. Iterative constant comparison with raw data and how these were translating into creative models to visually conceptualise understandings, aided triangulation and helped reflexive thinking. These are complex processes for all researchers, but even more so for those less experienced. The use of diagrams can help clarify these processes (Silverman 2024) and validates calls for novelty in every stage of the research process (Graybill 2025; Sergeeva et al. 2022; Lê and Schmid 2022). These calls justify further studies that demonstrate how scholars innovate other types of methods to encourage more origination in research methods. We hope the ideas presented in this article, go some way to offering such innovation.

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