

Mentoring Women in STEM Careers: The Reciprocal & Agentic Role of Context

Paul Stokes, Ileana Monti and Marina Larios

ABSTRACT

Mentoring discourse has a long history. There are many different approaches to mentoring but most fail to account for the impact that contexts can have on how mentoring is enacted. This is problematic because, without this, it is difficult to properly evaluate the impact of the mentoring itself. We use a case study research design to critically evaluate a recent mentoring intervention, carried out in Arequipa, Peru. Using theories of institutional theory (Paik *et al.* 2011), power (Clegg 1989), reciprocal mentoring (Haddock-Millar *et al.* 2024) and agency (Bencherki *et al.* 2024), we explore the contextual issues at play and develop a framework which explains why there are significant differences in emphasis and focus between mentoring definitions, programs and initiatives.

KEYWORDS

Mentoring, women in STEM, culture, context, power, Peru

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ABSTRACT

Mentoring discourse has a long history. There are many different approaches to mentoring but most fail to account for the impact that contexts can have on how mentoring is enacted. This is problematic because, without this, it is difficult to properly evaluate the impact of the mentoring itself. We use a case study research design to critically evaluate a recent mentoring intervention, carried out in Arequipa, Peru. Using theories of institutional theory (Paik *et al.*, 2011), power (Clegg, 1989), reciprocal mentoring (Haddock-Millar *et al.*, 2024) and agency (Bencherki *et al.*, 2024), we explore the contextual issues at play and develop a framework which explains why there are significant differences in emphasis and focus between mentoring definitions, programs and initiatives.

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Mentorat des femmes dans les carrières STEM : le rôle réciproque et agentique du contexte

RÉSUMÉ

Le discours sur le mentorat a une longue histoire. Il existe de nombreuses approches différentes du mentorat, mais la plupart ne tiennent pas compte de l'impact que le contexte peut avoir sur la manière dont le mentorat est mis en œuvre. Sans cela, il est difficile d'évaluer correctement l'impact du mentorat lui-même. À l'aide des théories institutionnelles (Paik *et al.*, 2011), du pouvoir (Clegg, 1989), du mentorat réciproque (Haddock-Millar *et al.*, 2024) et de l'agence (Bencherki *et al.*, 2024), nous explorons les questions contextuelles en jeu et développons un cadre qui explique pourquoi il existe des différences significatives dans l'accent et l'orientation entre les définitions, les programmes et les initiatives de mentorat.

MOTS CLÉS

Mentorat, femmes dans les STEM, culture, contexte, pouvoir, Pérou

Mentoría para mujeres en carreras STEM: el papel recíproco y agencial del contexto

RESUMEN

El discurso sobre la mentoría tiene una larga historia. Existen muchos enfoques diferentes sobre la mentoría, pero la mayoría no tiene en cuenta el impacto que los contextos pueden tener en la forma en que se lleva a cabo. Esto es problemático porque, sin ello, es difícil evaluar adecuadamente el impacto de la mentoría en sí. Utilizando teorías sobre la teoría institucional (Paik *et al.*, 2011), el poder (Clegg, 1989), la mentoría recíproca (Haddock-Millar *et al.*, 2024) y la agencia (Bencherki *et al.*, 2024), exploramos las cuestiones contextuales en juego y desarrollamos un marco que explica por qué existen diferencias significativas en el énfasis y el enfoque entre las definiciones, los programas y las iniciativas de mentoría.

PALABRAS CLAVE

Mentoría, mujeres en STEM, cultura, contexto, poder, Perú

Introduction

As Stokes *et al.* (2020) have argued, it is important to consider the context surrounding coaching & mentoring programs due to their agentic nature. By using the term context here, we are referring to the circumstances that form the setting for a mentoring program, as well as the terms within which it can be fully understood. Following Shoukry and Fatien (2024) on coaching, mentoring programs can similarly be seen as being inherently social in nature and situated within a larger political and social context. It is difficult to understand the complexity of mentoring programs without having an appreciation of the context in which they are located and the influence that context has. However, there does not seem to be a theoretical framework that enables both academics and practitioners to account sufficiently for the impact of context on mentoring programs and initiatives. We will argue here that such a theory is needed because contexts in which mentoring programs are located have as much power to impact upon outcomes as human actors do. Building on this agentic notion of context, Haddock-Millar *et al.* (2024) suggest, in their work on reciprocal mentoring programs, there is an ongoing dialectical relationship between the internal context of a mentoring program and the external context in which it is located. Two of the key facets of external context are the national culture of the country in which the program is located (Helfrich, 2023), as well as the professional culture(s) in which the program participants are located (Trede *et al.*, 2012).

In this article, we examine this agentic role of context as seen through the lens of a recent mentoring intervention, funded by the British Council, and carried out in Arequipa, Peru via a tripartite relationship between Sheffield Hallam University (SHU), UK, Inova Consultancy, UK, and the National San Agustín University of Arequipa (UNSA). This focus brings an additional contextual factor to the fore: that of women in STEM (Science Technology, Engineering & Maths) careers. There has been significant attention paid to women in STEM careers, with research examining issues such as gender gaps in participation (e.g. Soylu Yalcinkaya & Adams (2020); gender stereotyping (e.g. Moe, Haussman & Hirnstein, 2021) and career progression (e.g. Adams-Harmen & Greer-Williams, 2023). Furthermore, there has also been significant attention paid to how women in STEM careers can be supported by mentoring (e.g. Zhang, 2024; Blaique *et al.*, 2023). However, there is little in the South American context which explicitly examines the impact of the cultural context on women in STEM careers. Funds were awarded for the partners to design, deliver and evaluate a mentoring program pilot between female academic staff as mentors and their students as mentees within UNSA. The project was designed to enable female mentees to develop their own agency and take control of their own personal and professional development with confidence by giving them access to support, constructive challenge and the opportunity to develop invaluable personal and professional skills so as to make significant progress in their careers. This is particularly important in Peru, a country that, despite making significant progress in recent years, still experiences significant deprivation and disadvantage in relation to development and career progression for women (Avolio *et al.*, 2023). Our intention was to use this mentoring program as an empirical setting for exploring the agentic role of context in mentoring, as opposed to conducting a full-scale evaluation of program and its impact.

As Avolio *et al.* (2023) report, women have increasingly entered academic and professional fields in Peru. According to their figures, the participation rate of women in the Peruvian labour force increased from 43.7% in 1990 to 70.0% in 2019 which was the highest rate in Latin America. However, as they also point out, this increase in participation has not resulted in an increase in career progression for women to more senior levels in organisational hierarchies. Following Hofstede's (2011) dimensions of national culture, Peru is classified as a patriarchal society with a sizable gender gap and a collectivistic culture, as compared with other countries in Latin America. This implies that the challenges facing women in terms of societal progression within Peru may be more significant than in other Latin American countries. As Terán-Cázares *et al.* (2019) have argued, Peruvian organisational culture and national culture are closely intertwined which suggests that Haddock-Millar *et al.*'s (2024) model of a dialogical relationship between internal and external contexts in mentoring programs, may be a useful conceptual framework when considering the role of context in mentoring.

Mentoring: A selected survey of existing literature

Mentoring, principally, is concerned with how human agents – mentors and mentees – work together as part of a relationship so as to enable psycho-social support and/ or career progression for the mentee (Kram, 1983). There are many different definitions of mentoring, each with a different emphasis or focus. Nevertheless, Sunderman & Orsini's (2023: 41) definition contains elements that are common to many of those definitions:

"Mentoring is a developmental relationship often between a more experienced (e.g., older) mentor and a less experienced (e.g., younger) mentee. Mentoring relationships tend to serve a particular developmental purpose, such as leadership development, career development, or intercultural development".

Garvey & Stokes (2022), in their earlier historical review of mentoring discourse, examine how mentoring has evolved over thousands of years into its modern form that mentors and mentees experience today. In particular, they explore how mentoring practice can be understood in terms of its modes, i.e. Group mentoring, peer mentoring, co-mentoring, e-mentoring, reverse mentoring and self-mentoring. Furthermore, as Haddock-Millar *et al.* (2024) have argued, mentoring discourse continues to evolve, with a contemporary and significant interest in the place of reciprocity within mentoring relationships. Nevertheless, in the main, mentoring still retains its focus on the dyadic relationship between mentor and mentee (Aris *et al.*, 2024). Despite this broad consensus, Stokes *et al.* (2020) show, in their comparative analysis of coaching & mentoring, there is still a need for a framework which can be used to explain why there are significant differences in emphasis and focus between mentoring definitions, programs and initiatives. The main reason for these differences is due to the impact of the contexts in which different mentoring initiatives are located. As we will explore below, different contextual influences affect the ways in which mentoring needs to be enacted, in order for it to be effective. Therefore, it is important to say more about the way in which the context is agentic, which we do by using the notion of reciprocity in mentoring as explored by Haddock-Millar *et al.* (2024). Haddock-Millar *et al.* (2024), in their edited text on reciprocal mentoring, draw on 26 case studies of mentoring schemes to develop their framework. Whilst their work is empirically based, it should be noted that the cases were principally generated by those responsible for delivering their respective programs. Arguably, these case study contributors are likely to play up the deliberate design features of their programs and pay less attention to other contextual factors. Nevertheless, Haddock-Millar *et al.* (2024) do manage to provide a working theory of reciprocity in mentoring, which is useful to us here.

In their analysis of reciprocal mentoring at program level, Haddock-Millar *et al.* (2024:3) argue that reciprocal mentoring can be defined as being where "*mentoring is deliberately two way*" and the aim is "*to enable both participants to learn by engaging in the learning dialogue*". Reciprocal mentoring is seen as being distinct from traditional/ conventional mentoring, with the latter more typically being about one way learning by the mentee, from the mentor. In traditional mentoring, benefits to the mentor are seen as a helpful unintended by-product of mentoring, rather than as a central design feature, as they are in reciprocal mentoring. According to Haddock-Millar *et al.* (2024), reciprocal mentoring programs have four different emphases:

- 1- Creative Challenge -this refers to the tendency of reciprocal mentoring programs to foster the challenge of conventional organisational norms and assumptions
- 2- Mutual Understanding & Respect – this is concerned with the encouragement of equality, diversity and inclusion across all reciprocal mentoring programs
- 3- Development of networks -the fostering of personal and professional networks is integral to reciprocal mentoring programs
- 4- Self- Actualisation – here, the focus is on competence acquisition and enabling participants to reach their full potential

These emphases show the dialogic relationship between program context and societal context by identifying the places where societal and program contexts meet, within mentoring programs.

They then go on to argue that each of these program domains have a dialogical relationship with broader societal contexts which include:

- Transition, power and disruption
- Education, progression, empowerment
- Equality, Diversity and Inclusion
- Community, clusters and collaboration

Haddock-Millar *et al.* (2024) framework can then be used to understand and interpret the overlapping and interlinking contexts that affect mentoring programs by mapping the interconnections between these contexts. They conclude *“that there is a reciprocal relationship between broader societal contexts and the organisational contexts within which reciprocal mentoring schemes are located”*, where the societal context heavily impacts upon the organizational mentoring program. (Haddock-Millar *et al.*, 2024: 212). Crucially, they also argue that the organizational mentoring programs have a reciprocal impact on that societal context. The dialogic nature between the local and societal context is an important part of building a theory of context in mentoring programs.

In order to further explore this dialogical impact of context, it is next necessary to engage with issues regarding the power and agency that the context brings to mentoring.

Power, agency & mentoring

Garvey & Stokes (2022) argue that power is a key dynamic within mentoring (and coaching) relationships. Importantly, they make the point that it is not that helpful to see power as residing in or with individuals, but as being co-created between individuals or groups. It is also possible to argue, as Lukes (2005) does in his seminar text on power, that it is problematic to conceive of power as something that is purely behavioural, and which is exercised by a human actor/ agent upon another. This is partly because it, in his view, ties the idea of power too closely to evidence of overt behavioural conflict, rather the recognising power as impacting on the very wants and needs of individuals. Clegg (1989) was one of the first writers to offer a conceptual framework for considering non-human agency in relation to power within organisations. Clegg (1989: 188) puts it like this:

“Not all agents are human actors. Agency may be vested in non-human entities as diverse as machines, germs, animals and natural disasters. These, and more especially organizations, may be agencies under the appropriate conditions.”

Clegg (1989) goes on to put forward a theoretical model which he calls the circuits of power model. This model includes what he refers as ‘normal power’, i.e. power and influence exercised by agents such as human actors which have control over organisational resources and outcomes. Clegg (1989) refers to this type of power as causal due to its impact, in critical episodes, on those organisational outcomes. It is the most recognised and popularised view of power within organisations. However, his framework also recognises other ‘circuits’ of power such as the rules and regulations within organisations which govern practice within organisations, such as the routes that individuals and groups have to travel down in order to gain access to opportunities and other groups – Clegg (1989: 214) refers to these as *“obligatory passage points”*. These are the rules that every organisation has which determine the ways things get done within them via social integration mechanisms. He calls this dispositional power due to its focus on the rules of meaning and relationships between individuals and groups. Finally, Clegg’s (1989) framework also draws our attention to a third focus of power which he calls domination due to its focus on the innovation of systems of production

and determining which systems are empowered/ disempowered within organisations. These systems include processes for innovation in organisations – Clegg (1989: 215) argues that these processes “*are not only carriers of innovation but almost invariably bearers of domination*”. Essentially, Clegg (1989) is making the case for non-human entities to have power and agency within organizational systems. Although others (Boje & Rosile, 2001; Velasquez, 2025; Suddaby, 2025) have more recently engaged critically with Clegg’s (1989) work, the circuits of power framework with its emphasis on non-human entities, which carries explanatory power for our purposes here. In particular, it enables a discussion about the agency of contextual factors such as systems, structures and cultures. Whilst social systems, such as professions, organisations and cultures are constructed and sustained by human agents, they nevertheless have an agency that is separate from the human agents that sustain them. Furthermore, such systems, once created, play a critical role in influencing the behaviour of the human agents that created them. Bencherki *et al.* (2024) conducted a systematic review of agency and they offer the definition below on agency,

“Agency is therefore not an individual (human) being’s capacity to act but occurs through the expression of excess action (affect), which may augment the ability to act of different kinds of individuation processes, such as persons, teams, organizations, or other social collectives” (Bencherki *et al.*, 2024: 1351).

Their perspective on agency emphasises the social collective nature of agency and they undertake a thorough review of the assumptions underpinning agency and how it applies in organizations. One particular aspect of this analysis is relevant to our analysis of mentoring and the agentic role of context. In their analysis of agency, they argue that agency does not necessarily start with a human being deciding to do something. Rather, it starts from an awareness of groups of individuals that they are being affected by something, such as the prevailing organisational culture. This challenges the traditional notion of cause and effect embedded in human agency. As Bencherki *et al.* (2024: 1366) put it, “*the idea that agency has no already-existing, already-constituted agents may give the impression that no one is responsible for the events that take place and the actions that are taken*”. They essentially argue that, rather than trying to work who or what is responsible for a particular course of action, it is better to try and understand how individuals’ different needs and wants intersect within a cultural context. This enables an understanding of how the prevailing environment is impacting the phenomena being examined.

Returning to our focus on mentoring women in STEM careers, it is clear that, in order to examine the agentic role of context in the chosen mentoring program, it is important to have a conceptual framework which can be used to make sense of the agency of societal and professional cultural factors impacting on the mentoring program. One such framework is offered by Paik *et al.* (2011). Paik *et al.* (2011), in their work on international human resource management (IHRM) practice, employ institutional theory to help explain the dialogical relationship between local and international/global practices. They argue that there are three main societal drivers or ‘pillars’ of IHRM practice which then affect how organisations respond and interact with these ‘pillars’. Paik *et al.* (2011) then use these responses to explain differences and similarities between IHRM practice dynamics. One of the strengths of Paik *et al.*’s (2011) framework is that it gives a way of conceptualising the broad societal contexts that impact upon mentoring programs. In addition, Paik *et al.*’s (2011) approach also provides us with a way of understanding the different and competing influences that come from those contexts. Paik *et al.*’s (2011) approach does have some weaknesses. Firstly, as it is, itself, located within a specific (HR strategy) context, it does have a particular firm-level strategic focus on responses to strategic context, rather than focusing on the context itself. Also, the framework is not mentoring specific and does not deal explicitly with interpersonal dynamics. Nevertheless, as we are seeking to develop a way of explaining differences between mentoring programs based on the role that their context plays, this is a useful framework because it does examine the link between organisational and societal contexts. Below we briefly summarise how Paik *et al.* (2011) explain the relationship between the three pillars, the expected organisational responses and the resultant impact on IHRM practice dynamics. This is summarised in Table 1.

Regulative Pillar & Divergence Effects – here Paik *et al.* (2011) argue that due to the relative power of local regulations and processes within each country, these rules, laws and frameworks are likely to have a significant impact on organisational response to societal context, with the most likely outcome being compliance with local laws and policies. Hence, they argue that this is likely to promote a divergence across countries due to their different laws and policies.

Normative Pillar & Convergence Effects – Paik *et al.* (2011) argue that due to the propensity of organisations to imitate the practices of successful organisations, there will also be a drive towards practices becoming more similar to one another across different countries due to this mechanism.

Cultural-Cognitive & Crossvergent Effects – finally, Paik *et al.* (2011:655) argue that in the cultural domain, which we are mainly concerned with in this article, that “cultures are shaped and reshaped through interactions with other cultures in which people reflectively or unconsciously insert new meanings into their own cultural understandings”. In other words, they are arguing that cultural impact is often seen as being about the emergence of hybrid practices which have elements of both local and international traits. In essence, organisational responses can be characterised as a compromise position between different cultural influences.

Mentoring programs – as we have argued so far – are inevitably located within particular contexts and are influenced by them. This is particularly the case when exploring the influence of both national and professional cultures. As Paik *et al.*'s (2011) analysis of IHRM practice dynamics suggests, there are often different and competing factors which determine how organisations respond to the institutional pillars. Similarly, we argue that this is the same with analysing the complex relationship between mentoring programs and their contexts. In particular, we propose that the crossvergence dynamic is a useful way of explaining how the process agentic approach, outlined by Bencherki *et al.* (2024,) affects participants in a mentoring women in STEM program and that it offers us a useful way of understanding how cultural pillars and drivers impact upon mentoring program participants. Using a case study methodology, in the next section, we will articulate our research methodology in terms of data collection and analysis.

Methodology

Data collection

The Women in STEM mentoring program in UNSA took place between April 2023 and February 2024, involving 60 women participants (20 mentors and 40 mentees). It progressed in several discrete stages, as shown in Figure 1 below

Data was collected at each stage of the process principally by descriptive survey (De Vaus, 2014) and was principally focused on gaining feedback on participants' experience of the program in terms of the matching and mentoring skills training. Here, we are exclusively focused on the qualitative data collected as part of the impact evaluation stage- the data collection process is described below.

As part of the summative evaluation of the Mentoring Women in STEM program, 10 one-to-one semi-structured interviews (Roulston, 2010) were conducted with five mentors and five mentees. One of the authors was responsible for setting up the evaluation process with the program participants whilst another conducted the interviews in Spanish and then translated the interview transcripts into English. Finally, the lead author led the analysis of the data into themes using the other two authors to act as critical reviewers of the theme generation process. As described above, these interviews were conducted in addition to the more program-specific survey data which focused on specific evaluation metrics such as frequency of meetings, satisfaction with the mentoring matching and subjective measures of success e.g. increased confidence, frequency of meetings (see Appendix 1 for prompt questions used by the interviewer in the interviews). The sample size of 10 interviews was chosen in advance, for practical reasons of

convenience and to be manageable as part of the impact evaluation and there was not an attempt to reach saturation as is common in qualitative methodologies (Miles & Huberman, 2003). Limited resources, such as time and funding, often necessitate smaller sample sizes in qualitative research. This does not compromise the study's validity if sampling decisions are transparently documented and guided by the research objectives, as they were in this case (Bryman, 2012; Morse, 2000). Nevertheless, the five mentors and five mentees were selected as being representative of the sixty participants in terms of career stage, age and focus on STEM specialism.

Data analysis

Following Gray (2014), we chose to take a grounded theory approach to the data. This approach, while stopping short of classical grounded theory methodology (Glaser & Strauss 1967), began with data collected from the participants about their experience of the mentoring program, as opposed to a pre-determined template developed from the literature. This involved identifying key areas of consensus around the responses of the interviewees and then identifying the overarching theme that brought these responses together. For example, in generating the theme of challenging women's gendered role in society, we first identified that all of the interviewees made reference to their gender and how the mentoring program enabled them to think about themselves within that context. The next step was then to characterise those responses so that an appropriate theme could be interpreted from the data which explained how these interviewees were seeing the impact of the mentoring program on their role in society.

In order to do this, we used an inductive framework (Ragin, 2023), relying on a phenomenological approach that consists of distinguishing common themes running through the interviews (Roulston, 2010). All interviews were conducted by one person (a Spanish speaker) and translated into English. The other two researchers reviewed the transcripts and generated a template of themes using a template analysis process (King 1998). This involved the authors examining the transcripts and coding them into several themes. These themes were then interrogated by the authors, following the template analysis process, where some initial themes were combined and aggregated up into larger themes, whilst other, larger, initial themes were broken down into sub-themes. For example, our initial analysis of the transcripts combined elements of increased mentee confidence with those of challenging gender roles within society. However, following this interrogation of the initial themes, these were separated out as having them as two themes had greater explanatory power.

Findings

As described in the data analysis section above, the collected data was analysed, and several key themes were inducted. These key themes will be explored using the data and the conceptual synthesis developed in the literature review.

Challenging women's gendered role in society

For most of the women – both mentors and mentees – the context of gender roles within broader Peruvian society was a key feature of their mentoring experiences. For example, Mentee 2 said that she felt the mentoring had prompted her to question the societal expectations that are typically placed on someone with her gender:

“So, in the challenges that I found was that first the limitations or stereotypes that society put on me. I said to myself, but there are people who do make it and others don't. But what is that gap that prevents us from being or not being?”

She felt that her mentor had supported her by giving her space within their mentoring conversations to begin to question these limiting assumptions. Mentee 5 also recognised this phenomenon within her current workplace, given that she was one of the only women working in that particular space:

“Okay, uh, professionally. In the company where I’m working, but I had some conflicts there because the career is very focused on what is male and basically where I work I am the only woman who develops software. So it’s like sometimes I felt very diminished by my own bosses, right? And they wouldn’t give me tasks because they thought I wouldn’t be able to do them.”

She felt that her own self-confidence was diminished by this experience which then meant that she had felt unable to challenge this barrier. However, her mentor encouraged her to “grab hold of her bosses” and tell them what she wanted, which was starting to bear fruit in terms of having increased access to interesting projects.

Like Mentee 2, Mentee 3 also reported internalising a lack of self-belief but she also felt that the mentoring program (referred to by her as ‘the course’) had helped her to bring these self-limiting beliefs into conscious awareness, thus enabling her to challenge those assumptions:

“I feel like there were ideas that I didn’t understand yet. As a woman, I said that I’m not going to be able to do this or talk about this because I still had these ideas that I didn’t know I had. But when I saw the course, I realized that yes, I mean, there were things that I didn’t, I didn’t see them the same, I didn’t think them in the same way.”

There also have been similar outcomes for the mentors on the program in terms of reframing their own experience. For example, Mentor 3 talked about how her (gendered) caring with ageing parents caused her to neglect some of her own career aspirations:

“The main thing is that I rejuvenated because I discovered that I had hidden dreams. And so, I said I’m encouraging my mentee because deep inside of me, I left a lot of things on hold. One of them was because, well, my parents were very old and so I let a lot of things happen. When I was mentoring my mentees, I started asking them what their dreams were like, what they looked like. I started to remember a lot of things and then the truth is that I rejuvenated my heart was inflated with my dreams again to continue entrepreneurship, to keep walking forward and discover new things.”

In other words, Mentor 3 recognised that mentoring had reciprocal benefits for both her and her mentees. For her, this meant that she was able to get back in touch with her own dreams and career aspirations that she had put on hold. This reciprocity was also the case for Mentor 4, who described how she was attracted to the mentoring program as a mentor because of her expectation that she would be valued because she was a woman, not despite being a woman:

“I came to the mentoring program because of a friend. I told her how frustrated I was because the doors were closed to me because of who I was and because I had a way of thinking that was contrary to the people who are running the university. Then she told me “look, there is an opportunity where you can participate as a researcher and where the fact that you are a woman will be valued”. Then she passed the word to me. And well, it was this mentoring program.”

Referring back to the Paik *et al.* (2011) categories, the women in this program seem to be using the mentoring program as an artefact for rethinking and reframing their cultural assumptions about gender and society, which is a clear example of crossvergence in international human resource management terms. The cultural framework, in which the mentoring tools and processes were embedded, draws heavily on cultural norms about empowering women which are more present within European & USA culture (Garvey & Stokes, 2022). As a result, all participants have arguably reached a hybrid position in relation to the UNSA mentoring program, in this respect, due to the way in which the women have been able to use it to work on and within the context of women working in STEM careers.

Increased personal confidence & personal agency

A strong feature of all of the interviews, including the mentors, was that they all reported a positive impact on their sense of personal agency and sense of confidence. Like in many mentoring programs, almost all participants reported an increase in personal confidence in their work lives and also in their personal lives. For some, like Mentee 1 described this in terms of being more vocal and realizing more opportunities were within reach, even within her current student status at the University:

"I think before this I was a bit more quiet. It was like I felt that the university process was just going to be one step and that after university I had to do more things. But I feel that by talking to my mentor now and also having heard the stories of the other mentors and mentees as well, you kind of realize other things that you can do during university. It's kind of opened up my vision of what I can still do."

This outward expression of confidence was also similar for Mentee 2, whose mentor gave her some positive feedback on the change that she saw in her:

"It was something that improved me, there was a change in me before I entered the course. When there was the last session with my mentor," she told me, "I see you very differently. When we met at the first session, you were shy. And now you're telling me about several things you have planned."

This positive affirmation of her increase in confidence by her mentor is something that was also reported in mentor interviews. For example, Mentor 4 said, of one of her mentees:

"She has developed other skills, learned new things, her way of being has changed. I see her as more extroverted. Because she used to be very closed, she didn't tell other people things. She didn't say anything. But now she's improved that part, she's also improved a lot of soft skills, making her talk and making her tell me and get more information out of her."

Linking back to the gender roles theme above, Mentor 1 discussed the all-too-common theme of sexual harassment of the mentees by their male counterparts or even superiors. She pointed to the pivotal role that her mentoring played in helping one of her mentees deal with a particular instance of harassment:

"Mm-hmm, if they don't grab you, then they start trying to exclude you, in preference to other people or other girls who can accept their words. Because that shouldn't even be in words. So that's kind of a consequence. But in this case, it was easy. It was easy. Just with two words well spoken. Measured, not direct so as not to make a problem."

In essence, this mentor was able to support her mentee in developing the confidence to deal with the issue in a sophisticated enough way to avoid outright confrontation, which meant that the bad behaviour of the male colleague did not continue.

All mentors reported an increase in their own personal confidence, which was often expressed in terms of increased interpersonal skills or attributes. For example, Mentor 5 recognized that she was listening more rather than 'telling' and intervening:

"I've started to listen more, because I talked a lot. I've already been one of those people where I always liked to be the focus of attention. I've always lent a hand, and I intervened in everything, with my colleagues, it's the same at home and with my children. I didn't listen to people much."

Even that happened with my children, because I have children who are already in their teens. I was one of those moms that I dominated above all, but now I listen to them and try to get more information out of them and then I do a little mentoring even with them so that they can explain to me, that they tell me."

It is also noticeable that the increase in confidence and skill has extended beyond the mentoring program itself and is starting to show an impact in other areas of her life. In the case of Mentor 1, she also recognized that, as a result of the mentoring training program, she had become more confident in her ability with the emotional & relational side of working with younger women mentees:

“For all the reasons mentioned above and because by interacting with people from other careers, I can feel more confident in aspects in which they have more knowledge. I not only understand them as professionals, but also as human beings, as we all have our own problems and life experiences. This generates a greater understanding of the person in general.”

In other words, she had previously relied on her knowledge of her mentees' professional domain but was now able to work with a wider range of mentees who had different levels of expertise from her.

In terms of Paik *et al.*'s (2011) conceptual framework, these experiences resonate strongly with findings from other studies (Haddock Millar *et al.*, 2024; Garvey & Stokes, 2022) regarding increasing personal confidence and skills on the part of participants. It therefore seems reasonable to argue that there is some measure of convergence with other mentoring programs that take place in different countries and contexts in this respect.

Challenging personal journeys

A key theme that emerged from the data was the accounts from both mentors and mentees, which described the challenges that they needed to overcome to complete their career progression journeys. These challenging personal journeys had to be placed within a similarly challenging professional context for the participants, given the political unrest in Peru at the time and the industrial action being undertaken by university staff. This adds weight to the argument that these contexts are agentic in terms of mentoring programs such as this one. Mentors often talked of finding their own career 'path', about 'progression' and about 'obstacles' or 'hurdles' along the way. Because the mentoring process itself was time-constrained, all participants referred in measure to the relative speed or slowness of their (or others') progress. Mentors often implicitly talked about how difficult they had found it to negotiate the difficult 'terrain' of their chosen career path and many of their accounts had the feel of a long and sometimes arduous journey. Hence, in their mentoring work with their mentees, who were at the beginning of their careers in STEM, they saw themselves acting as a guide along the journey, whose role it was to point out opportunities for 'making progress' as well as pointing out potential 'pitfalls'. Another key theme that emerged from the interview data was how the challenge that the University context and the broader professional context, within which the women operated, impacted upon their progress & journey. One key impediment was the strike and political unrest within Peru, which impacted mentee progression. As Mentee 3 points out, this had particular consequences for women working in STEM careers:

“So I already had my thesis as plan A. But the strike happened and lasted a long time, and what I advanced was my internship. Because to get out of high school we need internships, and I advanced that and I was in the laboratory, I was going, but the doctor with whom I had to advance my thesis was not there. And then it became difficult for me to do the preliminaries and also the weather changed here and I could no longer take the sample.”

In summary, Mentee 3 raises several issues which impacted on her career progression: the strike within UNSA, the need to get an internship and the importance of the external physical environment for those working in natural sciences. Mentee 5 also points to the impact of the strike in terms of her mentor's absence from the university which led to scheduling issues. This was also compounded by the fact that her mentor got COVID and was unable to work with her for a period of time. Mentee 2 also raised the issue of her optimism to take things forward in her career, due to her having *“a negative idea of what a scientific career like mine is, because I also started to think about careers like mathematical physics here in Peru, not being given the recognition that they really deserve”*.

Some of the mentors also experienced challenges. Mentor 5 talked about her frustration with the length and frequency of the mentoring program, partly due to the strikes within the University:

"This first stage has been brief and we have barely had time to interact with other mentors. We haven't had enough time with the mentees either. During the four months we have been there, the four sessions were insufficient. I would have liked to have had at least six or eight more months with them to make more progress. There were only four sessions scheduled and they seemed very few to me. Time passed quickly."

Mentor 4 also spoke at length about her own lack of career progression and, in particular, how the relative lack of professional recognition impacted her personal motivation:

"I was defeated. I didn't really want to do anything because I had tried so many things. COVID took away a very important person for me, many situations that were difficult for me to deal with. It was like having no life expectancy in the area of research as a professional for what I had done."

She explained how the mentoring program had enabled her to reclaim some of that professional identity as a result.

Mentor 2 also felt that the mentoring program had offered her a way of integrating mentoring within her professional discipline and identity, although she too expressed some frustration with the program in terms of being able to completely define key terms (something that is important in her own field of expertise):

"It's the first time that a mentorship comes out in the university, to hear the name of mentoring in our charter, but there was never the real opportunity to define what mentoring, advising, tutoring was, what was the difference between them all?"

In summary, it is possible to argue that the specific combinations of the STEM career professional context, coupled with the Peruvian political context, meant that this mentoring program was likely to diverge, in Paik *et al.*'s (2011) terms, from other mentoring initiatives in other countries and contexts. This was due to the compliance mechanism that Paik *et al.* (2011) argue is a typical response to regulatory dynamics in the external environment. Whilst striking behaviour and political unrest would not usually be identified as being compliant, in this case, we argue that the particular circumstances within which the mentoring program was located meant that participants complied with the local and professional norms with which they were associated.

Discussion of the results

Now that we have explored the fieldwork themes using the Paik *et al.* (2011) framework, we will discuss the implications of this analysis for the agentic role of context. We will seek to put forward a view of mentoring that accounts for the complex web of power and cultural relations present in this program.

To summarise, we have thus far argued that three key themes emerged from the 10 interviews: challenging gender roles within society, increased personal confidence and challenging personal journeys. We claim that by enabling participants to reexamine gender roles within Peruvian society, via the mentoring program, a hybrid culture has been created within the mentoring program context. The mentoring theory and practice used in the training, development and practice of mentoring in this program has been derived from a British cultural context via the British Council-funded initiative. This training, development, and practice needed to be adapted to a Peruvian cultural context, accounting for gender roles, professional STEM culture, and academic culture. Following Paik *et al.* (2011), we see this theme as an example of cross-vergence, where a compromise between British & Peruvian culture position is reached. Mentors are most useful to their mentees when they demonstrate understanding and empathy for the local context that they are each dealing with. This requires mentors to integrate the values of personal empowerment with the constraints of operating as a female STEM professional within a Peruvian academic context. When discussing the theme of increased

personal confidence for mentoring participants, we see this as being typical across most mentoring programs and therefore as an example of convergence through the mechanism of imitation of other successful mentoring initiatives in other contexts. Finally, due to the challenging professional context within which the mentoring program was located, this means that it will diverge from other mentoring programs in other countries and contexts due to these local and professional contexts.

Riven through the interviews we conducted about the mentoring program, there are many examples of how the women had recognised that they were disempowered by the prevailing context in terms of what they wanted for themselves and their careers in terms of what was possible and achievable for them. Whilst some of their accounts are indeed about certain individuals exercising power through existing relationships, the majority are not. Rather, many of the participants talk about how their proximate professional network/ culture was a powerful factor in their career progression journey, conditioning them not to want things and to accept their given roles within society. Therefore, this leads us to consider how non-human entities like professions, organisations, and cultures can be agentic in terms of mentoring.

Applying this idea to mentoring programs, it is possible to argue that mentoring programs have the potential to bring innovative thinking and action into organizational contexts by their propensity to challenge norms. In the case of the mentoring program in Peru, the mentoring program challenges the male orthodoxy within STEM careers, but as Clegg (1989) also argues, this brings with it resistance from the incumbent career progression paths and cultures. It is important to re-state that these obligatory passage points, described above, are not necessarily policed by malign individuals who are actively preventing women from progressing in their STEM careers. Nevertheless, the women in our study experience these circuits of power as though they were due to their agentic role in this particular context. It is also worth pointing out that the program we were involved in, in Peru, was the first of its kind for women in STEM careers which suggests, via our analysis of Clegg's (1989) work, that previous attempts to progress women within STEM careers were disempowered by the previously more dominant process of male advancement.

Conclusion: The agentic & reciprocal role of context in mentoring

In this article, we have brought together three core bodies of theory in order to develop of theory of the agentic role of context in mentoring. By using Paik et al's (2011) concepts of convergence, divergence and cross-vergence, we were able to provide an explanation for how mentoring programs are influenced by and influence societal contexts, and how particular societal/ cultural contexts result in distinct and different enactments of mentoring practice. Combining this analysis with Clegg's (1989) circuits of power framework meant that we had a theory which explains the influence of non-human entities such as systems, processes and frameworks on the way mentoring is enacted by recognising that these entities are the ways that context gets embedded into mentoring theory and practice. Finally, the theory of reciprocal mentoring (Haddock-Millar *et al.*, 2024) enabled us to articulate how a reciprocal relationship between mentoring program context and societal context works by recognising the dialogical relationship between these two sorts of context.

All of these ideas have been applied to our analysis of the women in STEM mentoring program in Peru as an empirical context through which these ideas might be explored and applied. Arguably, the case of the Women in STEM mentoring program in Peru can be seen as a reciprocal mentoring program in terms of outcome (Haddock-Millar *et al.*, 2024). In other words, the program was designed to be a traditional mentoring program with mentors helping mentees with their career progression. However, what the evaluation showed was that both mentors and mentees benefited from the program. Our three themes that we identified from the evaluation interviews were:

1. Challenging women's gendered roles in society

2. Increased Personal Confidence and Personal Agency
3. Challenging Personal Journeys

There is a dialogic and reciprocal relationship between these program themes and the broader societal drivers they connect to. Taking the first theme, as shown by the British Council's Gender Equality Partnerships program, there are clearly broader societal dynamics at play which, in Clegg's (1989) terms, are empowering this discourse around career progression for women in general. Broader agendas regarding equality, diversity and inclusion in Peruvian society and, more widely, within the international context due to the British Council's gender equality agenda are impacting on the participants via the mentoring program. Following Bencherki *et al.* (2024), our data shows that this socio-cultural context has power and agency in terms of its effect on the mentoring program and, in turn, on its participants. Moving onto the second theme, the broader discourse around education, progression and empowerment is patently agentic here as a context which then stimulates a mentoring program which emphasises self-actualisation, increased personal confidence and personal agency.

We assert that there is a reciprocal, dialogic relationship between these social drivers and the program drivers within the Peru mentoring program. Following Clegg (1989), we see that relationship being enacted, principally, by non-human entities - programs, systems, professional cultures – which, nevertheless, have agency in terms of their impact on the human actors in the eco-system which contains the mentoring program. Paik *et al.* (2011)'s work, in turn, gives us an analytical framework which we can use to understand the impact on mentoring program design that these various contexts have.

Extrapolating beyond this immediate empirical context, we conclude by claiming that, by taking an agentic view of context within mentoring programs, we can deepen our understanding of how, why and who these programs work for, and in what circumstances. In the next section, we explore this contribution to the field of mentoring further.

Contribution to the field of mentoring

In their work on the role of context in coaching & mentoring, Stokes *et al.* (2020) call for more practice-based research to shed light on the role that context plays within mentoring programs. Our research does this by offering practice-based research that explains how context can be powerfully agentic and reciprocal within a mentoring program due to its socio-cultural impact on participants, as opposed to power being solely exercised by human actors. Furthermore, based on their more recent work on coaching, Shoukry and Fatien (2024:39) make the following statement:

“On this basis, we argue that coaching should be understood as a social practice, a politically loaded activity performed in situ, in a recursive movement of production within a larger societal context.”

We argue that our work here has begun to provide some conceptual building blocks for moving mentoring more towards being recognised as a politically loaded activity, located within a reciprocal relationship between mentoring programs and their societal contexts via the response mechanisms outlined by Paik *et al.* (2011). In the next section, we will conclude by examining the limitations of the study and implications for future research.

Limitations of the current study & future research

It is important that we acknowledge the limitations of this current study. In this article, we have chosen to examine the interview accounts of 10 participants, which is only one part of the evaluation data. Whilst we are confident that this group is representative of the participants on the program, we cannot make any claims that this represents all mentoring programs for women, either in Peru or elsewhere. We also acknowledge that as practitioners as well as researchers,

we are in favour of mentoring as a process and believe in its potential to enable career progression for women in STEM careers, which may, of course have influenced our interpretation of the results. Finally, this study was conducted in a difficult and challenging context for the participants, i.e civic disruption, institutional industrial action, which may have accentuated the impact of the external context somewhat. Nevertheless, we believe that there is a need for further research that evaluates the agentic role of context in mentoring programs and includes this alongside the impact of other human actors within mentoring programs and initiatives. Also, mentoring programs designers need to properly account for that contextual impact within their evaluation processes and programs design itself so that they can leverage the benefits of a reciprocal relationship between societal and programs drivers.

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Appendix, table and figure

Appendix 1. Interview questions for UNSA mentors

Interview Questions for UNSA Mentors

1. How well has the mentoring program worked, from your perspective?
2. What have been the main benefits for you personally?
3. What have been the main challenges for you personally?
4. What do you believe that your mentees have gained from the process?
5. What would you say have been the main challenges for your mentees?
6. What impact do you expect the mentoring program to have on the career progression of your mentees within STEM?
7. What impact, if any, would you say that the mentoring program has had (or will have) on your own career progression within STEM?
8. What else would you like to tell us, about your experience on the mentoring program, that you have not yet had chance to tell us about?

Interview questions for UNSA mentees

1. How well has the mentoring program worked, from your perspective?
2. What have been the main benefits for you personally?
3. What have been the main challenges for you personally?
4. What do you believe that your mentor has gained from the process, if anything?
5. What would you say have been the main challenges for your mentor, if any?
6. What impact do you expect the mentoring program to have on your career progression within STEM?
7. What impact, if any, would you say that the mentoring program has had (or will have) on your mentor?
8. What else would you like to tell us, about your experience on the mentoring program, that you have not yet had chance to tell us about?

Table 1. Paik et al.'s (2011) framework

Institutional Pillars	Company Responses	IHRM Practice Dynamics
Regulative	Compliance	Divergence
Normative	Imitation	Convergence
Cultural-Cognitive	Compromise	Crossvergence

Figure 1. Mentoring for women in STEM timeline

