

Article

Career Development of Early Career Researchers via Distributed Peer Mentoring Networks

Annika Martin ¹, Julia Mori ² and Dominik Emanuel Froehlich ^{1,*}¹ Department of Education, University of Vienna, 1010 Vienna, Austria² Department of Research in School and Instruction, University of Bern, 3012 Bern, Switzerland; julia.mori@unibe.ch

* Correspondence: dominik.froehlich@univie.ac.at

Abstract: This paper explores the challenges early career researchers (ECRs) face in academia and the benefits of being part of a distributed peer mentoring network. The study highlights the importance of social capital and emotional and motivational support in promoting wellbeing and career development, particularly during the COVID-19 pandemic. Using both qualitative and quantitative methods, the paper examines the impact of a collaborative environment on individual productivity and the development of clear goals. The study reveals that the supportive network of like-minded, ambitious people across borders and hierarchies offers the opportunity to identify with others and create a sense of belonging. The paper concludes by emphasizing the need for qualitative methods of social network analysis to investigate the meaning of social structures in the career development of ECRs.

Keywords: early career researchers; peer mentoring network; career development; social capital; productivity



Citation: Martin, A.; Mori, J.; Froehlich, D.E. Career Development of Early Career Researchers via Distributed Peer Mentoring Networks. *Merits* **2023**, *3*, 569–582. <https://doi.org/10.3390/merits3030034>

Academic Editor: Wendy M. Purcell

Received: 30 June 2023

Revised: 23 August 2023

Accepted: 25 August 2023

Published: 4 September 2023



Copyright: © 2023 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

The environment for career development in academia has undergone significant changes in recent years. Job demands now encompass conducting excellent research, teaching, demonstrating leadership and management, writing for diverse audiences, and raising funds. Consequently, the learning processes for prospective academics have become less linear and more akin to a sequential series of learning cycles [1]. The challenges of academia are particularly pertinent for early career researchers (ECRs) in the first decade of their academic or research careers [2]. Many ECRs grapple with uncertainties related to future career progression and external circumstances such as the repercussions of the COVID-19 pandemic [3].

The pandemic has prompted a global re-evaluation of public life and necessitated a realignment of academic institutions and existing work and network structures. Consequently, numerous scientific conferences—critical platforms for professional exchange and relationship building—have been cancelled or transitioned to virtual formats [4,5]. The imposed pandemic restrictions have adversely affected the career development of ECRs. For these individuals, connections with the academic community are crucial, as they are key components in establishing and expanding an academic career and fostering professional development [1,6–9]. Recently, Froehlich [8] examined the concept of social capital in an in-COVID and post-COVID world, suggesting the need for more in-depth methods to comprehend the role of social connections in career outcomes. In particular, he advocated for a greater focus on the qualitative methods of social network analysis to investigate the significance of social structures and to reconsider the concept of social capital in a post-COVID world [10]. One potential strategy for creating meaningful networks in the post-COVID world is through mentoring groups. Such groups can be particularly beneficial in the early stages of an academic career, fostering learning experiences and personal growth [11,12]. Mentoring has been recognized as a pivotal mechanism to assist ECRs in making progression in personal, professional, or career development [13]. Existing

research demonstrated that mentoring has beneficial outcomes for women in academia and early career academic staff such as increased research productivity, promotion success, and career satisfaction [14–16]. Co-authoring papers, assisting in the preparation of articles without expecting authorship credit, and group brainstorming sessions serve as examples of mentoring group activities. In this context, so-called distributed peer mentoring networks (DPMNs)—“groups where the members are not physically present and meet virtually [...], the members are equal and mentor each other, as opposed to the more traditional hierarchical mentoring structure” [17] (p. 43)—appear to be especially relevant. This is particularly relevant given the international focus of academia and the large peer group of ECRs.

This research embarks on a novel journey to delve into the role of DPMNs in the career progression of ECRs by employing a design-based research approach. We have principally aimed to unravel the following research question: What is the perceived role of a DPMN in the career advancement of ECRs? Through our investigation, we seek to unmask the inner dynamics of existing peer mentoring networks, shedding light on their potential benefits and challenges for ECRs. By doing so, we strive to extend our understanding of DPMNs and their influence on the career trajectories of ECRs. This exploration aims not only to contribute to the burgeoning scholarly discourse on ECRs’ career development but also to offer practical insights for academic institutions, policymakers, and individual researchers. It is our aspiration that this research will stimulate further conversation and inspire innovative practices in utilizing DPMNs as an integral part of ECRs’ career advancement strategies in a post-COVID academic landscape.

1. Theoretical Background

1.1. Career Development of ECRs

To ensure employability in academia, Early Career Researchers (ECRs) must navigate a wide array of tasks. These include teaching and administrative duties, research-related activities such as writing grants, reviewing manuscripts, and publishing articles, as well as supervisory duties [18,19]. Academics are also expected to undertake research stays abroad and collaborate with other research teams, necessitating changes in residence and flexibility in personal life [20]. The demand for such multifaceted expertise can cause ECRs to experience anxiety and stress, which may impact their performance, job satisfaction, well-being, and their likelihood of remaining in the profession [6,21,22].

Several factors contribute to a successful academic career. Browning et al. [23] (p. 372) proposed that strategies such as earning a research doctorate, receiving mentorship, attending conferences, supervising postgraduate students, being part of an active research group, receiving support in developing grant applications, and having access to financial start-up funds could all significantly enhance career prospects. Echoing Smith, academics themselves have reported that working within a “strong, collegial department” [6] (p. 1000) was particularly beneficial for their growth and development. Furthermore, factors such as nationality, culture, economy, and political environment might also play a role in career development [24].

Given the challenges ECRs face in forging a successful academic career, an important question arises: “How can ECRs be better supported in gaining a foothold in academia?” Investing in social capital may provide one avenue for creating a sense of support during their academic journey.

1.2. Career Development and Social Capital

Career development is highly individual and varies across professions [25–27]. As noted by Roach and Sauermann [27], academics typically exhibit higher intrinsic motivation to work than individuals in other occupations. They are often willing to accept lower salaries and more stringent working conditions in exchange for greater independence and flexibility [8]. Academics also operate in a highly competitive environment, which includes writing grant applications, publishing articles in top-tier journals, attracting highly qualified

staff and students, and procuring resources [23]. To navigate their careers successfully, ECRs can greatly benefit from an effective (inter)national network, productive mentoring, and participation in collaborative research because a robust network can serve as a form of social capital [9].

In career development, it is not only professional expertise that is required but also social capital, which encompasses the formation of networks, exchange of resources, and provision of support on a human level. Lin [28] (p. 4) defined social capital as “resources embedded in one’s social networks, resources that can be accessed or mobilized through ties in the networks. Through such social relations or social networks, an actor may borrow or capture other actors’ resources (e.g., their wealth, power, or reputation)”. Social capital depends on the structure of the network, the actors involved, and the quality and quantity of the relationships. Consequently, everyone involved in this network can benefit from the circulating capital, irrespective of a direct and personal relationship with the provider of the respective resources [29]. Despite its relevance and importance, research at the intersection of social capital and career development of ECRs is currently limited [30–37].

1.3. The Role of DPMNs in the Career Development of ECRs

Mentoring in the early stages of an academic career is considered to have positive effects: these include fostering professional independence [38], networking within one’s research field, increasing self-confidence, providing advice and essential information, offering opportunities to reflect on one’s own (research) practice, improving effectiveness [39], and holding particular value for, for instance, women or individuals from marginalized communities [40]. For doctoral candidates, mentoring is about imparting knowledge and skills and encouraging discipline and emotional support throughout the dissertation writing process [41] (p. 202).

Research in the area of Distributed Peer Mentoring Networks (DPMN) is scarce, as the available work primarily relates to distributed mentoring in specific domains, such as organizational contexts/workplaces, urban high schools, isolated faculty, pre-service teachers, and fan communities [2,42–45]. Regarding socializing in the research community and supporting the development of a meaningful network for ECRs, “[evaluation] studies of mentoring programs that facilitate multiple developmental relationships in academia suggest multiple mentors are important” [1,46]. Incorporating social network theory, it is argued that a broader network with “weak ties” is more effective than focusing exclusively on a small number of “strong ties” due to the associated access to a more significant number of referrals and resources [1]. Career-related peer mentoring facilitates connectedness to one’s career choice and academic integration [47].

Distributed mentoring can be understood as networked communities in which people of all ages and experience levels interact and support each other through a complex, interwoven web of interactive, cumulatively sophisticated advice and informal instruction and is seen as a new type of mentoring. This form is characterized by “aggregation, accretion, acceleration, abundance, availability, asynchronicity, and affect” [42]. Complementing this, three essential elements of a DPMN can be identified [17]: (a) confidentiality (a supportive environment where unrestricted thoughts and concerns can be shared), (b) external support and/or validation (illustrating the value of the peer mentoring to faculty development), and (c) commitment (investing time and energy into the network to help it grow into an entity in which participants support each other). Establishing DPMNs allows ECRs to create and expand a strong network within their research field, which can benefit their entire career. For instance, a meaningful network can contribute to the job finding process or establishment of collaborations on projects, indirectly contributing to a successful academic career [48]. However, the benefits of DPMNs to the tertiary sector in general, and precisely the benefits to the career-related outcomes of ECRs, remain uncertain. In our research, we sought to address the recent call for qualitative methods of social network analysis to investigate the meaning of social structures in the career development of ECRs [9].

Examining an ECR network aims to determine the relationships between individuals within the network and their professional development. Different parameters can be considered. As the network and the relationships that ECRs build and their influence on professional development are of particular interest, social network analysis—an approach which aims “to investigate relations and social structures through the use of networks and graph theory” [49]—is applied. According to Saxena et al. (2019), who researched the social networks of students, social network analysis served as a suitable tool to examine the relationships and performances within a collaborative network. Such an analysis not only reveals the extent of benefits a member of a network enjoys but also clarifies the relevance of specific actors or groups in supporting learning processes within the learning environment.

2. Method

In alignment with a qualitatively driven, design-based research (DBR) methodology [50], this study employs a multimodal data collection approach. We aim to dive into the specific context in detail with a direct aspiration to effectuate practical implications. This strategic approach enables us to illuminate the underexplored intersection of ECRs, their social capital, and the role of Distributed Peer Mentoring Networks (DPMN).

All 15 members of an established DPMN were contacted and asked about their interest in participating in this study. In the course of this, participants indicated whether they were interested in being interviewed and completing the questionnaire, or only completing the questionnaire. Ten participants completed the questionnaire only and five were also available for an interview. The participants were either in the final phase of their doctorate, i.e., about to finalize their thesis, about to defend it, or in a post-doctoral position. Firstly, we conducted a semi-structured, problem-centered approach with the ECRs from three distinct European countries who were all part of the same DPMN. Each interview, which lasted approximately 60 min on average, was conducted in English and focused on aspects such as collaboration within the network, the nature of relationships built, and the added value the network provided for their academic careers. Our selection criteria for the interviewees necessitated that they should have been active members of the focal DPMN for a minimum period of six months and should have actively participated in at least one offered format (for example, co-working, development circle, networking). Prior to the commencement of the interviews, we ensured that all participants were fully briefed on the purpose of the study, following which informed consent was obtained. The privacy policy, outlining the anonymity and confidentiality of their responses, was also shared with the participants.

Secondly, we utilized a questionnaire with ordinal scaled questions to gather quantitative data. This instrument served to understand the extent of participation in the network over time, the networking formats in which participants engaged, satisfaction levels with the network, as well as the individual perceived benefits of participation. To encourage the voice of the participants and invite more nuanced insights, we also incorporated free text fields within the questionnaire for additional input and comments. The items were also formulated based on the pre-established thematic framework. The collected audio recordings of the interviews were stored locally on the interviewer’s work computer for the sole duration required to complete the transcriptions. Subsequently, all audio recordings were deleted. The transcripts at hand were anonymized upon completion, thereby precluding any inferences about the participants. The transcripts themselves were marked with alphanumeric combinations, designed to equally ensure the absence of any discernible conclusions. The questionnaire was administered using SoSci Survey and disseminated to participants via a hyperlink.

The collected qualitative data was meticulously analyzed using QCMap (Association for Supporting Qualitative Research, ASQ, v.1.0.9, 2021). Employing content analysis techniques, we sought to capture both explicit and latent attitudes and opinions, following the method suggested by Mayring [51]. To execute the content analysis, the data was meticulously reviewed and systematically coded according to predefined criteria and themes (the relationships and performances within a collaborative network). This process

involved breaking down the data into meaningful units of analysis, which were then assigned relevant codes that corresponded to the predefined themes. These codes were developed through a thorough process of iterative refinement, ensuring that they accurately captured the nuances and variations present in the data. Following the coding process, the codes were grouped into broader categories that reflected overarching themes and patterns. The analysis was driven by a deductive approach. Due to the scope of the research project, no intercoder reliability was established. The content analysis employed a structured and systematic approach to dissect and interpret textual data. The methodological framework facilitated the extraction of meaningful insights, patterns, and themes. The resulting analytical categories emerged organically from the data, mirroring research on students' social networks, where the relationships and performances within a collaborative network were examined [8]. This allowed us to delve deeper into the unique dynamics of ECRs' social capital and their participation in DPMN.

This study identified two principal categories related to the professional development of Early Career Researchers (ECRs) through the lens of their engagement within the Distributed Peer Mentoring Network (DPMN). The first category, labeled 'Effectiveness of the Collaborative Environment,' encapsulated the value derived from the non-hierarchical structures of the DPMN. Participants underscored the relevance of reciprocal support, the shared and participatory work ethic, productive feedback mechanisms, and the exchange of information and resources. Moreover, participants emphasized the benefit of individual work being purposefully structured and guided by clear, self-imposed goals for designated work periods. An illustrative example of this dynamic comes from the following excerpt from our first interview: "Especially during Corona, it was helpful to know there was somebody. You log in, and there are some, you know, green points [symbols showing people on-line], and they're like, [...] start at 11:00 a.m."

The second emergent category was denoted as 'Academic Performance'. It centered on the implicit expectations and requisite tasks for ECRs, including external funding applications, producing publications, generating citations, and undertaking teaching roles. Additionally, the importance of administrative tasks, developing a research network, guiding students, and participating in international research projects was noted.

To underscore the influence of the DPMN on academic performance, consider the following anecdote from our third interviewee: "[If] I would like to write a paper with new co-authors, I would definitely look in the network and ask Daniel or Jasmin". Furthermore, this testimonial by the fifth interviewee underscored the DPMN's critical role in academic productivity: "[Participation in the network] probably saved my dissertation [...] had I not have [sic!] this system, I'm not sure I would have finished on time, and no, it was about productivity and so on [...]".

These categories highlight the significant role the DPMN plays in fostering a conducive collaborative environment and enhancing academic performance amongst ECRs, therefore contributing to their professional development.

3. Results

The following results will be structured based on the main categories that emerged when coding the interviews.

3.1. Effectiveness of the Collaborative Environment

Concerning the efficient and productive management of their work hours, the participants acknowledged the importance of establishing distinct objectives prior to their designated work periods. Such goal-oriented conduct not only enhanced their awareness of their accomplishments and progress but also underscored the significance of their tasks. The practice of formulating and communicating clear goals to peers served as a recurrent reminder of the relevance and value of their work.

The ECRs also demonstrated cognizance of the crucial need for work-life equilibrium and personal wellbeing. The demarcation between professional duties and leisure activities

can often become indistinct in the academic realm, necessitating robust intrinsic motivation and deriving pleasure from the work itself. Long-term career success hinges significantly on maintaining a healthy balance between mental and physical wellbeing. Interactions with fellow network members continually reinforced the need for a healthy work-life balance. Such exchanges emblemize the overarching aim of the network—fostering the individual development of its members. Active participation led to conscious reflection and an altered, positive perception of individual development. The platform and channels in the DPMN provided a scaffolding or toolbox [Interviewee 2]. Members could use the platform according to their available time [Interviewee 4].

Another significant aspect of the effectiveness of a collaborative environment is emotional support and motivation. Members appreciated co-working during the months of lockdown due to the COVID-19 pandemic. Above all, knowing that they were not alone was helpful. “[...] Especially during Corona, [...] you log in, and there are some, you know, green points [symbols showing people on-line], and they’re like [...] start at 11:00 a.m.” [Interviewee 1]. Mutual support emerged not only through collaborative work but also in the platform’s various communication channels. These included, for example, feedback from the entire community or sharing the results of publication efforts. Platform participants exchanged mutual insights into each other’s work and fostered motivation and support through shared experiences. The platform provided an opportunity for connection between ECRs and space to reflect and widen their scientific horizon. Participants emphasized the more accessible potential collaborations and the opportunity to ask for help, discuss and exchange ideas, or establish new collaborations.

The diversity of academic degrees and the experience of building a heterogeneous network were mentioned. Half of the survey participants rated the existing contacts within the network as “very meaningful”. Being in contact with other academics enabled interviewees not just to be able to draw from their knowledge and resources but also to improve their language skills. The connection to other young academics led to higher confidence in getting in touch with other researchers and was assessed as “the most impact on my professional development [...]” [Interviewee 2]. As a result, the established and maintained contacts between ECRs increase individual outreach, which is seen as parallel to the usual conference experience. Meeting at a conference would be simplified and could change the entire conference experience.

In contrast, conferences with the parallel running of various presentations and workshops make it challenging to create new valuable contacts. Participants saw participation in a DPMN as positive and beneficial [Interviewee 4]. Interviewees stated they enjoyed exchanging a more personal nature with others before or between work sessions. One respondent rated the impact lower than that of the local faculty peer group. The difference was attributed to greater proximity and time spent with the local group. Participants could experience each other’s work ethos, leading to reciprocal motivation [Interviewee 3]. Overall, the effectiveness of the working environment was described as motivating and inspiring.

3.2. Academic Performance

The interviewees described various opportunities that arose as they used the platform. They often highlighted access to the network and thus to possible collaborators: “[...] I would like to write a paper with new co-authors; I would definitely look in the network and ask Daniel or Jasmin.” [Interviewee 3]. Informal exchanges on a personal and professional level broaden the spectrum of people with whom possible collaborations may arise, for example, the participation in another research group or guest lectures [Interviewee 3]. Especially during the COVID-19 pandemic, when many conferences were cancelled, the members felt the platform provided a good opportunity to make new professional contacts. As one interviewee put it: “[...] all the outlined opportunities would not or could not have happened outside the network for me (because I didn’t know the people, for instance)” [Interviewee 5]. Experiences within the network contributed to their professional development and reputation in the scientific community. Multiple interviewees mentioned that

the network provided opportunities for the exchange of research ideas. This was coupled with the possibility of expanding the network with people from other institutions that may prove useful at later points in an individual's career.

The participants expressed that their involvement in the DPMN was highly satisfactory, impactful, and influential. They used phrases such as "really, really great", "had the most impact", or "significant impact" to describe their experience. For example, "I think the DPMN [...] impact for me was great, I would say, because it was exactly the time when I needed to write my [PhD] thesis. Moreover, it was quite nice to log in and have someone working simultaneously. So, I think it had a high impact." [Interviewee 3]. It is essential to take into account that interviewees define "professional development" differently and individually, depending on their self-identified weaknesses or goals. However, the consensus was further development in order to achieve the self-set goals regarding professional development [Interviewees 2 and 3].

Overall, these results indicate a highly positive impact of the DPMN and showed its usefulness to participants. Obtaining feedback is essential for reflection and continuous improvement of research and teaching performance, especially when entering academia. However, the time-consuming aspect of obtaining feedback was emphasized. Participation in the network enabled immediate feedback on the work produced and was evaluated by the participants as cheerful and helpful. At the same time, the exchange of feedback allowed them to practice the art of giving feedback by assessing the work of others and, at the same time, obtain insights into peers' work.

The participants demonstrated a positive impact of the network on individual productivity. One interviewee mentioned the supportive and motivating effect of the network which "[...] probably saved my dissertation [...] had I not have [sic!] this system, I'm not sure I would have finished on time, and no, it was about productivity and so on [...]" [Interviewee 5]. Some felt less distracted and used their time more effectively [Interviewee 4].

Thus, the accelerated progress in the individual writing process also accommodated the high productivity requirements in academia.

4. Discussion

4.1. General Discussion

The crux of our study lies in dissecting the influence a DPMN imparts on the professional trajectory of ECRs, accomplished through a design-based research methodology. In line with previous research on the positive impact of mentoring on academic career success [14–16], our analytical process unveiled the advantages participants gained from their inclusion in this peer mentoring network, such as honing in on defined objectives, introspecting on personal productivity and career evolution, and acknowledging the centrality of wellbeing to a successful career. Moreover, our findings indicate the integral supportive role of the peer mentoring network, presenting a gamut of opportunities like idea sharing in research and the identification of potential collaborators.

Apart from career progression, participants underscored the necessity of maintaining wellbeing and achieving a work-life balance for ECRs. The multifaceted challenges ECRs encounter include juggling teaching, research, administrative, and/or supervisory duties in a highly competitive milieu. Personal hurdles, including self-management, motivation, self-efficacy, or coping with additional family and financial responsibilities can compound stress during doctoral studies [52]. Further exacerbating these pressures is the potential inadequacy of writing skills—an essential component of doctoral research—which can induce significant anxiety for numerous ECRs [53]. Consequently, high stress levels, emotional burnout, and anxiety may plague ECRs [54,55], possibly leading to an exodus from the academic field [56].

Yet, engaging in dialogues with fellow members of the DPMN served as recurring reminders of the importance of striking a healthy work-life balance. Practices like peer mentoring, writing circles, and co-working foster a sense of psychosocial safety, provide platforms for resource and experience sharing, bolster successful outcomes of the academic

journey, and crucially, ameliorate mental health and wellbeing. By perceiving themselves as acknowledged and accepted members of the scientific community, ECRs tend to evaluate their environment more favorably, fostering a sense of belonging—one of the fundamental human needs [53–56]. The ensuing text sheds light on the trials faced by ECRs in managing their workload, formulating individual strategies and objectives to effectively deal with academic demands, the significance of setting clear objectives for concentrated work phases, aligning minor milestones with significant ones, and the instrumental role of mentorship in supporting ECRs. The influence of the focal DPMN on the career advancement of ECRs is also explored, concentrating on how the network assisted ECRs in concentrating on their objectives and augmenting their productivity. Additionally, the text underscores the importance of peer networking, emotional, and motivational support in enhancing the wellbeing of ECRs, particularly amid the COVID-19 pandemic.

4.2. Awareness and Planning of Professional Development

As previously noted, ECRs encounter a vast array of academic expectations [18,20] which demand tailored knowledge and comprehension. These expectations necessitate that ECRs devise personalized strategies and targets to manage these demands optimally. A noteworthy revelation from the interviews was the enhanced comprehension participants developed concerning precise objectives for concentrated work sessions through collective learning within the group. The rich tapestry of academic backgrounds and experiences within the group members facilitated mutual learning, underscoring the importance of setting defined goals to augment productivity, self-awareness, and introspection. The lack of hierarchical dynamics within the group nurtured a cooperative environment based on parity, aligning with the concept of mentorship as a relationship where novices are guided by their more seasoned peers and deriving benefits from their experiential wisdom [6,24].

For effective workload management, ECRs need to establish objectives for individual work sessions and overarching research projects. This includes aligning minor milestones and interim stages with substantial milestones. The study at hand comprised a diverse range of participants at varying stages of their academic careers, hailing from a multitude of European universities. It is crucial to evaluate the doctoral programs in the context of the Bologna reforms, inherent curricula, requirements, and their compatibility against the present research landscape. This need is emphasized by the stringent demands placed on ECRs and the skill deficit that needs to be addressed through suitable training during their academic pursuits [23].

To reiterate, ECRs face multifarious academic requirements [18,20] that call for specific knowledge and cognizance. ECRs must formulate individualized structures and objectives to proficiently handle these demands. An intriguing insight from the interviews was participants' improved understanding of explicit objectives for dedicated work periods through communal learning within the group. The wide variety of academic backgrounds and experiences among group members fostered reciprocal learning, underlining the need to delineate clear goals to bolster productivity, self-awareness, and self-reflection. The absence of rigid hierarchical structures within the group encouraged collaboration on an equal footing, resonating with the notion of mentoring where less experienced individuals gain guidance from their more experienced counterparts, reaping benefits from their socialization experiences [6,24].

4.3. Wellbeing

During the challenging times of the COVID-19 pandemic, when engaging networking opportunities were curtailed and the exchange of research ideas restricted, the network under investigation provided a platform to interact with peers from other institutions, replicating the networking usually facilitated by conferences. Given the escalating demands confronting ECRs—demands for which they may only be partially prepared—there is potential for increased anxiety and stress levels to impact their performance [21,22,47,57]. The environment in which an aspiring academic immerses themselves can significantly

influence their wellbeing and performance, underlining the role of peer interactions for both knowledge sharing and emotional and motivational reinforcement.

The favorable working atmosphere characterized by a diverse mix of personalities, disciplines, and perspectives, as reported by interviewees, beneficially impacted their emotional and motivational states. They appreciated the collaborative setting for working and exchanging ideas. A pivotal point repeatedly mentioned was the lack of any compulsion to participate, coupled with the ease with which they could temporarily disconnect from the network. The interviewees reported an increase in their perceived productivity, not only due to the collective presence of other members but also due to the optimal infrastructure and customized communication channels, like a dedicated feedback channel. In essence, this meets the criteria for meaningful connections, aligning with the concept of social capital as defined by Lin [28] (p. 4).

A supportive network consisting of ambitious, like-minded individuals, focused on productivity beyond geographic and hierarchical boundaries, offers a platform to find peers for identification and thereby cultivate a sense of belonging. The value of such connections is amplified as collaborations in diverse teams are known to advance academic careers. This facet aligns with the criteria proposed by Cox et al. [17] as participants felt invested in the network and contributed to its expansion.

4.4. Individual Productivity

Our investigation centered around the role of the focal DPMN in aiding ECRs to maintain focus on their objectives and boost their productivity. Through the interviews, participants brought to light the numerous advantages of the DPMN's non-hierarchical structure, favorable work ethics, and the capacity to offer swift feedback from a variety of perspectives and backgrounds. The emphasis the network placed on productivity and learning opportunities was considered by participants as crucial to the network's effectiveness in enhancing individual productivity. For a network to optimally contribute to ECRs' professional development, it must offer the necessary support. Interestingly, our study discovered that even a few hours of active involvement in the network resulted in a significant positive impact on productivity. Given the various academic demands faced by ECRs [18,20], the DPMN served as a supportive foundation to address challenges in a high-stakes environment.

Our study disclosed that previous research primarily focused on generalized mentoring relationships and only a handful of studies ventured into understanding the impact of distributed peer-mentoring networks on individual productivity. As such, there is a pressing need for additional research to delve into the specific form of mentoring offered by the DPMN and assess its impact on the professional development of ECRs within the realm of academic careers.

4.5. Reflection and Development

Engaging in a mentorship relationship, even within a digital framework, can present a valuable conduit for ECRs to remain aligned with their professional evolution. The DPMN that was the case study of this study serves as a nexus facilitating connections with contemporaries across various academic disciplines and levels, fostering the exchange of ideas, and preserving a sense of community and academic integration independent of temporal and spatial constraints. Isolation can precipitate a decline in productivity and emotional distress, with distributed peer mentoring networks offering a countermeasure to these adverse implications [17,48].

ECRs assign a spectrum of relevance and utility to the influence exerted by the DPMN. The network provides a toolkit for support and interaction, although the active and self-directed utilization of these resources is contingent upon individual members. The commitment and anticipations of members shape the eventual perception of outcomes.

Regular interaction with a diverse group fosters ECRs' professional and social evolution, a feature inherent in the network through its combination of structured and spon-

taneous collaborations. However, contingent on the network's size, striking a balance between a vast network and meaningful contacts can pose a challenge [17,19].

Although members underscore the necessity to expand the network's reach, vital opportunities have already been forged for their professional growth. Collaborative efforts, symposiums, research visits, and other professional interactions are highly prized. Establishing a network at an early career stage is pivotal, with a network encompassing varied academic degrees, nationalities, and personalities working collectively to leverage resources, information, and assistance. Active participation in a network facilitates the construction of social capital, with ECRs reaping substantial benefits from broad networks that consist of diverse research focuses and institutions, thereby molding their perspective of the research landscape [58].

Participation in the DPMN eased the negotiation and initiation of collaborations, including research stays, co-authorships, and guest lectures, irrespective of the interviewees' individual locations. Assertions that network participation facilitated the timely completion of dissertations imply that a robust network can yield benefits for ECRs' careers, as the absence of peer support can culminate in significant emotional and motivational stress [48].

4.6. Limitations and Implications for Future Research

Several restrictions should be recognized in interpreting the presented data. Firstly, the interviews were remotely administered via distinct Zoom rooms, and an observed decline in participants' attention, accompanied by heightened fatigue, suggests potential "Zoom fatigue" likely induced by the ongoing pandemic and its shift towards remote work and online activities. This fatigue may have compromised the quality of the interviews [59]. Secondly, participant selection bias may have influenced the results, given that participants voluntarily engaged in the study, which may imply a predisposition towards those who find more utility in the DPMN opting to participate. Also, we only researched one DPMN—taking a more general approach to sampling would not only make the findings more generalizable but would also allow analysis at different units of analysis [60]. Lastly, the study does not expound on the longevity of the peer mentoring network's benefits, raising the possibility that the short-term gains may not endure over extended periods, or potentially yield unforeseen ramifications.

The limitations, but also the findings, hint at potentially fruitful avenues for further investigation. Firstly, they call for the examination of long-term benefits and risks for the members of DPMNs. Specifically, future research should delve into the durability of benefits and investigate potential long-term disadvantages or unintended consequences. It is critical to understand if the enhanced productivity, clarity in goal setting, and improved mental health persist over time or if there are diminishing returns.

Second, this study followed the argumentation by Froehlich [9], which assumes a changed nature of social capital (and its consequences) due to the COVID-19 pandemic and the higher prevalence of digital communication. Given the digital nature of the DPMN and the probable "Zoom fatigue" experienced by participants, it would be valuable for subsequent research to compare the experiences, advantages, and drawbacks of virtual mentoring networks with their traditional, in-person counterparts.

Lastly, future research may focus on more specific career outcomes, such as employability [61]. While the present study explored this in general terms, future studies might focus on specific career outcomes, such as research productivity (number of publications, citations, etc.), career advancement (time to promotion, job satisfaction, etc.), and the development of professional skills. Such research could help quantify the benefits of peer mentoring networks in concrete career-related metrics.

4.7. Implications for Practice

The study also has implications for academic practice. The study's findings underline the need for academic institutions to recognize and promote the benefits of peer mentoring networks. Such networks could be formally integrated into academic programs, thus

ensuring that ECRs receive structured, consistent support throughout their professional development journey.

Furthermore, given that the format is relatively new, institutions could provide training to ECRs on how to effectively engage with and benefit from peer mentoring networks. Such training could include guidance on setting clear goals, making meaningful connections, and leveraging diverse perspectives within the network.

Importantly, the apparent benefits of peer mentoring networks on ECRs' career development suggest that participation in such networks could be considered in performance and career progression evaluations. By recognizing and rewarding engagement in mentoring, institutions can encourage a supportive, collaborative academic culture.

Author Contributions: Conceptualization, A.M. and D.E.F.; methodology, A.M.; resources, J.M. and D.E.F.; data curation, A.M.; writing—original draft preparation, A.M.; writing—review and editing, D.E.F. and J.M.; supervision, D.E.F. project administration, A.M. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: In the course of qualitative data collection and subsequent publication, a meticulous adherence to ethical guidelines is of paramount significance. Ethical considerations underscore the responsibility of researchers to safeguard the wellbeing, autonomy, and dignity of the participants involved in the study, as well as to ensure the integrity of the research process and the validity of the findings. Throughout the qualitative data collection phase, a comprehensive ethical framework was upheld. Prior to initiating the study, informed consent was obtained from all participants, elucidating the purpose of the research, the potential implications of participation, and the confidentiality measures that would be implemented. Participants were assured of their right to withdraw at any juncture without any repercussions. Furthermore, stringent efforts were made to anonymize and pseudonymize the collected data, thereby mitigating the risk of inadvertent disclosure of participants' identities. Moreover, ethical considerations extended into the realm of data analysis and publication. Rigorous efforts were undertaken to ensure that any information that could potentially identify participants was either omitted or suitably disguised. The reporting of results was conducted in a manner that upheld the confidentiality and anonymity of participants, thereby precluding the association of specific responses with any individual participant. The dissemination of the research findings through publication adhered to ethical principles that prioritize transparency and rigor. The manuscript underwent a comprehensive review process to ascertain that the depiction of participants' experiences was both faithful and unbiased, while also upholding the confidentiality commitments made to the participants. This entailed striking a balance between providing sufficient detail for the research to be understood and withholding information that could compromise participants' identities. Furthermore, it is worth reiterating that the present data and information were gathered within the framework of a supervised bachelor's thesis. The observance of the ethical code was subject to rigorous oversight by the thesis advisor.

Informed Consent Statement: Written informed consent has been obtained from the patient(s) to publish this paper.

Data Availability Statement: The data presented in this study are available on request from the first author. The data are not publicly available due to ethical and privacy of participants.

Acknowledgments: Open Access Funding by the University of Vienna; Special thanks go to Cornelia Schadler, University of Vienna, for her support and guidance in the conceptualization, implementation, and development of the bachelor thesis on which this article is based.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Ansmann, L.; Flickinger, T.E.; Barello, S.; Kunneman, M.; Mantwill, S.; Quilligan, S.; Zanini, C.; Aelbrecht, K. Career Development for Early Career Academics: Benefits of Networking and the Role of Professional Societies. *Patient Educ. Couns.* **2014**, *97*, 132–134. [[CrossRef](#)] [[PubMed](#)]
2. Campbell, J.A.; Aragon, C.; Davis, K.; Evans, S.; Evans, A.; Randall, D.P. Thousands Positive Reviews: Distributed Mentoring in Online Fan Communities. In Proceedings of the CSCW'16: Computer Supported Cooperative Work and Social Computing, San Francisco, CA, USA, 2 March 2015. [[CrossRef](#)]
3. Lopez-Verges, S.L. Mitigating Losses: How Scientific Organisations Can Help Address the Impact of the COVID-19 Pandemic on Early-Career Researchers. *Humanit. Soc. Sci. Commun.* **2021**, *8*, 284. [[CrossRef](#)] [[PubMed](#)]
4. Kalia, V.; Srinivasan, A.; Wilkins, L.; Luker, G.D. Adapting Scientific Conferences to the Realities Imposed by COVID-19. *Radiol. Imaging Cancer* **2020**, *2*, 204020. [[CrossRef](#)]
5. Weissgerber, T.; Bediako, Y.; Winde, C.M.; Ebrahimi, H.; Fernández-Chiappe, F.; Ilangovan, V.; Mehta, D.; Paz Quezada, C.; Riley, J.L.; Saladi, S.M.; et al. Mitigating Impact Conf. *Travel Cancel. Res. Futures. ELife* **2020**, *9*, 57032. [[CrossRef](#)]
6. Hollywood, A.; McCarthy, D.; Spencely, C.; Winstone, N. Overwhelmed at First': The Experience of Career Development in Early Career Academics. *J. Furth. High. Educ.* **2019**, *44*, 998–1012. [[CrossRef](#)]
7. Iqbal, J.; Qureshi, N.; Ashraf, M.A.; Rasool, S.F.; Asghar, M.Z. The Effect of Emotional Intelligence and Academic Social Networking Sites on Academic Performance During the COVID-19 Pandemic. *Psychol. Res. Behav. Manag.* **2021**, *14*, 905–920. [[CrossRef](#)]
8. Zacher, H.; Rudolph, C.W.; Todorovic, T.; Ammann, D. Academic Career Development: A Review and Research Agenda. *J. Vocat. Behav.* **2019**, *110*, 357–373. [[CrossRef](#)]
9. Froehlich, D.E. Career Networks in Shock: An Agenda for in-COVID/Post-COVID Career-Related Social Capital. *Merits* **2021**, *1*, 7. [[CrossRef](#)]
10. Coppe, T.; Thomas, L.; Pantić, N.; Froehlich, D.E.; Sarazin, M.; Raemdonck, I. The Use of Social Capital in Teacher Research: A Necessary Clarification. *Front. Psychol.* **2022**, *13*, 866571. [[CrossRef](#)]
11. Crocitto, M.M.; Sullivan, S.E.; Carraher, S.M. Global Mentoring as a Means of Career Development and Knowledge Creation: A Learning-based Framework and Agenda for Future Research. *Career Dev. Int.* **2005**, *10*, 522–535. [[CrossRef](#)]
12. Jones, C.K.; Kelsey, K.D.; Brown, N.R. Climbing the Steps toward a Successful Cooperating Teacher/Student Teacher Mentoring Relationship. *J. Agric. Educ.* **2014**, *55*, 33–47. [[CrossRef](#)]
13. Iversen, A.C.; Eady, N.A.; Wessely, S.C. The Role of Mentoring in Academic Career Progression: A Cross-Sectional Survey of the Academy of Medical Sciences Mentoring Scheme. *J. R. Soc. Med.* **2014**, *107*, 308–317. [[CrossRef](#)]
14. Denard Thomas, J.; Gail Lunsford, L.; Rodrigues, H.A. Early Career Academic Staff Support: Evaluating Mentoring Networks. *J. High. Educ. Policy Manag.* **2015**, *37*, 320–329. [[CrossRef](#)]
15. Gardiner, M.; Tiggemann, M.; Kearns, H.; Marshall, K. Show Me the Money! An Empirical Analysis of Mentoring Outcomes for Women in Academia. *High. Educ. Res. Dev.* **2007**, *26*, 425–442. [[CrossRef](#)]
16. Shen, M.R.; Tzioumis, E.; Andersen, E.; Wouk, K.; McCall, R.; Li, W.; Girdler, S.; Malloy, E. Impact of Mentoring on Academic Career Success for Women in Medicine. *Acad. Med.* **2022**, *97*, 444–458. [[CrossRef](#)]
17. Cox, A.; Blaha, C.; Cunningham, B.; Hunter, A.-B.; Ivie, R.; Phan-Budd, S.; Colon, I.R.; Rice, E.; Tucker, L.; Whitten, B. Distributed Peer Mentoring Networks to Support Isolated Faculty. *J. Fac. Dev.* **2021**, *35*, 43–48.
18. Ito, J.K.; Brotheridge, C.M. Predicting Individual Research Productivity: More than a Question of Time. *Can. J. High. Educ.* **2007**, *37*, 1–25. [[CrossRef](#)]
19. Froehlich, D.E.; Aasma, S.; Beausaert, S.A.J. Achieving Employability as We Age: The Role of Age and Achievement Goal Orientations on Learning and Employability. *Adm. Sci.* **2020**, *10*, 49. [[CrossRef](#)]
20. Richardson, J.; Zikic, J. The Darker Side of an International Academic Career. *Career Dev. Int.* **2007**, *12*, 164–186. [[CrossRef](#)]
21. Olsen, D. Work Satisfaction and Stress in the First and Third Year of Academic Appointment on JSTOR. *J. High. Educ.* **1993**, *64*, 453–471. [[CrossRef](#)]
22. Olsen, D.; Sorcinelli, M.D. The Pretenure Years: A Longitudinal Perspective. *New Dir. Teach. Learn.* **1992**, *1992*, 15–25. [[CrossRef](#)]
23. Browning, L.; Thompson, K.; Dawson, D. From Early Career Researcher to Research Leader: Survival of the Fittest? *J. High. Educ. Policy Manag.* **2017**, *39*, 361–377. [[CrossRef](#)]
24. Callanan, G.A.; Greenhaus, J.H. The Baby Boom Generation and Career Management: A Call to Action. *Adv. Dev. Hum. Resour.* **2008**, *10*, 70–85. [[CrossRef](#)]
25. Baruch, Y. Careers in Academe: The Academic Labour Market as an Eco-System. *Career Dev. Int.* **2013**, *18*, 196–210. [[CrossRef](#)]
26. Huisman, J.; Weert, E.; Bartelse, J. Academic Careers from a European Perspective: The Declining Desirability of the Faculty Position. *J. High. Educ.* **2002**, *73*, 141–160. [[CrossRef](#)]
27. Roach, M.; Sauermaun, H. A Taste for Science? PhD Scientists' Academic Orientation and Self-Selection into Research Careers in Industry. *Res. Policy* **2010**, *39*, 422–434. [[CrossRef](#)]
28. Lin, S.; Huang, Y. The Role of Social Capital in the Relationship between Human Capital and Career Mobility: Moderator or Mediator? *J. Intellect. Cap.* **2005**, *6*, 191–205. [[CrossRef](#)]
29. Riemer, K. *Sozialkapital und Kooperation: Zur Rolle von Sozialkapital im Management Zwischenbetrieblicher Kooperationsbeziehungen*; Mohr Siebeck: Tübingen, Germany, 2005.

30. Kandiko Howson, C.; Coate, K.; de St Croix, T. Mid-career academic women and the prestige economy. *High. Educ. Res. Dev.* **2018**, *37*, 533–548.
31. Cui, X.; Dunning, D.G.; An, N. Satisfaction among Early and Mid-Career Dentists in a Metropolitan Dental Hospital in China. *J. Healthc. Leadersh.* **2017**, *9*, 35–45. [[CrossRef](#)] [[PubMed](#)]
32. Marcella, R.; Lockerbie, H.; Bloice, L.; Hood, C.; Barton, F. The Effects of the Research Excellence Framework Research Impact Agenda on Early- and Mid-Career Researchers in Library and Information Science. *J. Inf. Sci.* **2018**, *44*, 608–618. [[CrossRef](#)]
33. Mtwisha, L.; Jackson, J.; Mitchel, A.; Aikins, A.d.G.; Kebirungi, H.; Outtara, K.; Viney, C. Early- and Mid-Career Transition to Research Leadership in Africa. *Wellcome Open Res.* **2021**, *6*, 74. [[CrossRef](#)] [[PubMed](#)]
34. Richards, G.C.; Bradley, S.H.; Dagens, A.B.; Haase, C.B.; Kahan, B.C.; Rombey, T.; Wayant, C.; Williams, L.Z.J.; Gill, P.J. Challenges Facing Early-Career and Mid-Career Researchers: Potential Solutions to Safeguard the Future of Evidence-Based Medicine. *BMJ Evid. Based Med.* **2021**, *26*, 8–11. [[CrossRef](#)] [[PubMed](#)]
35. Schneer, J.A.; Reitman, F. The Importance of Gender in Mid-Career: A Longitudinal Study of MBAs. *J. Organ. Behav.* **1994**, *15*, 199–207. [[CrossRef](#)]
36. Smalley, S.; Smith, A. Professional Development Needs of Mid-Career Agriculture Teachers. *J. Agric. Educ.* **2017**, *58*, 282–290. [[CrossRef](#)]
37. Wong, N. The changing landscape of research funding: Challenges for mid-career researchers. *Genome Biol.* **2019**, *20*, 178. [[CrossRef](#)]
38. Sambunjak, D.; Straus, S.E.; Marušić, A. Mentoring in Academic Medicine A Systematic Review. *JAMA* **2006**, *296*, 1103–1115. [[CrossRef](#)]
39. Knippelmeyer, S.A.; Torracco, R.J. Mentoring as a Developmental Tool for Higher Education. In Proceedings of the Academy of Human Resource Development International Research Conference in the Americas, Indianapolis, IN, USA, 28 February–4 March 2007; p. 8.
40. Beech, B.M.; Calles-Escandon, J.; Hairston, K.G.; Langdon, S.E.; Latham-Sadler, B.A.; Bell, R.A. Mentoring Programs for Underrepresented Minority Faculty in Academic Medical Centers: A Systematic Review of the Literature. *Acad. Med. J. Assoc. Am. Med. Coll.* **2013**, *88*, 541–549. [[CrossRef](#)] [[PubMed](#)]
41. Johnson, M.; Kumar, S. Mentoring doctoral students online: Mentor strategies and challenges. *Mentor. Tutoring Partnersh. Learn.* **2017**, *25*, 202–222.
42. Evans, S.; Davis, K.; Evans, A.; Campbell, J.A.; Randall, D.P.; Yin, K.; Aragon, C. More Than Peer Production: Fanfiction Communities as Sites of Distributed Mentoring. In Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing, Portland, OR, USA, 25 February–1 March 2017; pp. 259–272. [[CrossRef](#)]
43. Frens, J.; Davis, R.; Lee, J.; Zhang, D.; Aragon, C. Reviews Matter: How Distributed Mentoring Predicts Lexical Diversity on Fanfiction.net. *arXiv* **2018**, arXiv:1809.10268.
44. Froehlich, D.E.; Morinaj, J.; Guias, D.; Hobusch, U. Newly Qualified Teachers’ Well-Being During the COVID-19 Pandemic: Testing a Social Support Intervention Through Design-Based Research. *Front. Psychol.* **2022**, *13*, 873797. [[CrossRef](#)]
45. Shrinivasavadhani, J.; Panicker, V. Remote Mentoring a Distributed Agile Team. In Proceedings of the Agile 2008 Conference, Toronto, ON, Canada, 4–8 August 2008; pp. 322–326. [[CrossRef](#)]
46. Mayer, A.P.; Files, J.A.; Ko, M.G.; Blair, J.E. The Academic Quilting Bee. *J. Gen. Intern. Med.* **2009**, *24*, 427. [[CrossRef](#)]
47. Weaver, J.C.; Bertelsen, C.D.; Dendinger, G.R. Career-Related Peer Mentoring: Can It Help with Student Development? *Mentor. Tutoring Partnersh. Learn.* **2021**, *29*, 238–256. [[CrossRef](#)]
48. Janasz, S.C.; Sullivan, S.E. Multiple Mentoring in Academe: Developing the Professorial Network. *J. Vocat. Behav.* **2004**, *64*, 263–283. [[CrossRef](#)]
49. Längler, M.; Nivala, M.; Brouwer, J.; Gruber, H. Quality of Network Support for the Deliberate Practice of Popular Musicians. *Music Sci.* **2020**, *26*, 185–207. [[CrossRef](#)]
50. Bakker, A. *Design Research in Education: A Practical Guide for Early Career Researchers*; Routledge: Oxford, UK, 2018.
51. Mayring, P. Qualitative Inhaltsanalyse. 2015. Available online: <http://content.select.com/de/portal/media/view/552557d1-12fc-4367-a17f-4cc3b0dd2d03?forceauth=1> (accessed on 25 July 2023).
52. Pyhältö, K.; Toom, A.; Stubb, J.; Lonka, K. Challenges of Becoming a Scholar: A Study of Doctoral Students’ Problems and Well-Being. *Int. Sch. Res. Netw.* **2012**, *2012*, 934941. [[CrossRef](#)]
53. Cotterall, S. Doctoral Students Writing: Where’s the Pedagogy? *Teach. High. Educ.* **2011**, *16*, 413–425. [[CrossRef](#)]
54. Levecque, K.; Anseel, F.; Beuckelaer, A.; Heyden, J.; Gisle, L. Work Organization and Mental Health Problems in PhD Students. *Res. Policy* **2017**, *46*, 868–879. [[CrossRef](#)]
55. Stubb, J.; Pyhältö, K.; Lonka, K. Balancing between Inspiration and Exhaustion: PhD Students’ Experienced Socio-Psychological Well-Being. *Stud. Contin. Educ.* **2011**, *33*, 33–50. [[CrossRef](#)]
56. Hunter, K.H.; Devine, K. Doctoral Students’ Emotional Exhaustion and Intentions to Leave Academia. *Int. J. Dr. Stud.* **2016**, *11*, 35–61.
57. Beusaert, S.A.J.; Froehlich, D.E.; Devos, C.; Riley, P. Effects of Support on Stress and Burnout in School Principals. *Educ. Res.* **2016**, *58*, 347–365. [[CrossRef](#)]
58. Grant-Vallone, E.J.; Ensher, E.A. Re-Crafting Careers for Mid-Career Faculty: A Qualitative Study. *J. High. Educ. Theory Pract.* **2017**, *17*, 10–24.

59. Neshet Shoshan, H.; Wehrt, W. Understanding “Zoom fatigue”: A mixed-method approach. *Appl. Psychol.* **2022**, *71*, 827–852. [[CrossRef](#)]
60. Froehlich, D.E.; Mejeu, M.; Galey, S.; Schoonenboom, J. Integrating Units of Analysis: Applying Mixed Methods Social Network Analysis. In *Mixed Methods Social Network Analysis: Theories and Methodologies in Learning and Education*; Froehlich, D.E., Rehm, M., Rienties, B.C., Eds.; Routledge: Oxford, UK, 2020; pp. 38–48.
61. Heijden, B.I.J.M.; Notelaers, G.; Peters, P.; Stoffers, J.M.M.; Lange, A.H.; Froehlich, D.E.; Heijde, C.M. Development and Validation of the Short-Form Employability Five-Factor Instrument. *J. Vocat. Behav.* **2018**, *106*, 236–248. [[CrossRef](#)]

Disclaimer/Publisher’s Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.