Partnership between academics and practitioners – Addressing the challenges in forensic science

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A B S T R A C T

This research discusses the development of academic-practitioner partnerships in forensic science and examines the opinions and experience of those involved in the field. An anonymous online survey was completed by 56 participants who work in the field of forensic science. The questions related to their work experience, their experience of research and partnership, and their opinions on the benefits and barriers that exist. The results were analysed using a mixed methods approach, with quantitative analysis of the responses to closed questions using two-way chi-square statistical analysis, and qualitative analysis of the free text responses using reflexive thematic analysis. This work identifies the demand for partnership, the perceived benefits and barriers that exist, and establishes how the role of the participant (academic, pracademic or practitioner) impacts their view of partnership. We include the term pracademic to mean an individual who has worked as a practitioner and an academic, not necessarily simultaneously. Quantitative analysis identified that there was very little statistically significant difference in the responses between groups. Pracademics considered that 'institutional and cultural' and 'lack of the respect of the other role' were more significant barriers than the other groups. Association was also found between those with greater experience of research and the view that partnership 'improved legitimacy in practice' and 'increased legitimacy of research'. There was also statistical significance in those with more than average experience of partnership who identified 'improved legitimacy in practice' as a benefit of partnership.

Reflexive thematic analysis of free text comments identified a need and demand for partnership with three key themes developed as being necessary for successful partnership. These are the 'three 'R's' – the need for effective communication and the development of a **Relationship**; the **Relevance** of the partnership to the participants role; and the inclusion of personal **Reward** such as improved practice or better research.

1. Introduction

The Forensic Science Regulator (FSR) report of 2019 stated that the climate of forensic science in the United Kingdom (UK) was reaching the point of becoming 'untenable'. The factors that influenced this conclusion included lack of funding, lack of research and lack of oversight and governance in the field [1]. In addition, reports such as the Home Office Forensic Science Strategy in 2016 [2]; the Home Office Forensic Review in 2018 [3]; the House of Lords Science and Technology inquiry in 2019 [4]; National Academy of Sciences [5] and President's Council of Advisors on Science and Technology [6] reports in the US in 2009 and 2016 respectively, have not only challenged forensic science practice but also

the education and research taking place across the sector [7,8]. These findings were not a surprise to those working in the profession who have seen an increase in challenges to the discipline in the last ten plus years, particularly in relation to the validity of methods used and the lack of research [8].

The implementation of quality standards, which are a part of the Forensic Science Regulator's codes of practice [9], has added extra pressures on police forensic services to validate methods, ensure the workforce is competent, identify the limits of knowledge and ensure the validated methodology is used. In the UK in 2016, 'The Forensic Science Strategy' paper was published by the Home Office which detailed how forensic science provision would be reformed in the UK to ensure that it

remained effective and 'fit for purpose' [2]. It considered a variety of forensic delivery models that were in existence, including regional collaborations and partnerships between Police Services, and partnerships with Forensic Science Providers. It also proposed a national approach to ensure consistency, resilience, and to enhance capability, including the requirement for a statutory role for the Forensic Science Regulator (introduced in 2021) [9,10]. The value of academic-practitioner partnerships was included with a case study in relation to the Portsmouth University and Hampshire Constabulary partnership (Forensic Innovation Centre), created in 2014. Partnership between academics and practitioners has been found to be effective in other disciplines, such as nursing, with benefits to practice, education, and research [11].

Much of the discussion about partnership has failed to include the input of academia, and independent forensic science providers, instead concentrating on sharing of resources and personnel between police services. The House of Lords report in 2019 [4] discussed the need for education that is appropriate to practice and highlighted that practitioners should comply with an acceptable professional accreditation standard [4]. The value of academic-practitioner partnership is acknowledged in many other fields as an effective method to address challenges, as highlighted by Powell et al, (2018) [12] in relation to education. Partnership is recognised as being an approach to integrate relevant, cost effective and timely research into practice more widely across the criminal justice system too [13].

Hansen, Alpert and Rojek (2014) [14] identified a useful way of defining partnerships;

- cooperation – ad-hoc approach;
- coordination – larger more organised;
- and collaboration – which is an official, well organised, and coordinated partnership.

There are current examples of partnership between universities and police services, including the Staffordshire Forensic Partnership [15], the Lancashire Forensic Science Academy [16] and Forensic Innovation partnership in Hampshire [17]. There are also many other smaller ad-hoc collaborations. However, sharing experiences and best practice in establishing and maintaining these partnerships is still not widespread. There is very little analysis of the results and outcomes of forensic partnerships to date and more detailed assessment of their effectiveness would be helpful.

Communication and relationship building is essential in the formation of any successful partnership. 'Bridging the Gap' between academics and practitioners is seen as key factor [18] and research shows that success is negatively affected when this gap is not dealt with [19,20]. Failure to agree priorities, and lack of cooperation between academics and practitioners in forensic science is recognised [20] and without the explicit definition of needs and expected outcomes in a collaboration, each partner involved may have different expectations in relation to the direction and outcomes [21].

The inclusion of pracademics who have experience of 'real-world' practice and also academic practice may bridge the gulf between the two. In some disciplines pracademics have been found to bridge 'the ivory tower and the works of practice' although this is not without its challenges [22]. Pracademics' currency lies in their knowledge, experience, skills and professional networks and these are useful in creating collaborations [23] but, as Willis (2016) [24] posits, it is important that all groups, academics, practitioners and pracademics are perceived as equal to prevent tension arising from the different values or experiences.

Research is an integral part of successful partnership, 'Research culture' is a phrase that was highlighted by both Mnookin [25] and in the NAS report [5] as being important to ensure that forensic practice is robust and reliable. The inclusion of academics in the development of practice through teaching and research is considered essential [25]. There may still be a tension between research that impacts on practice and that which is seen as purely academic [26]. The inclusion of

pracademics may assist with the translation of the benefits of research [27].

Forensic Science needs to address organisational issues and structures, and there is opportunity for positive change. However, structural change alone will not address all the issues faced. [28]. Changing institutional goals and the difference in these goals between organisation were also perceived as a challenge, as has been seen in other sectors [13,29]. Planning for success is important, particularly with a number of partners across different industries.

Academic-practitioner partnerships present benefits and challenges as has been seen in research into policing partnerships [12,14,18,29]. Benefits seen in policing have included objectivity and validity, improved policy and procedure, and community relations [14]. However, considering the challenges as a community, across all disciplines and all stakeholders, taking a more holistic approach to research and practice, and working together for the future, not just the present, may positively impact the direction of forensic science [30].

In 2020 the Forensic Capability Network (FCN) was launched with the aim of bringing together members of the community from law enforcement and more widely across the criminal justice system, working with academia and other interested parties to address the challenges in Forensic Science [31]. Partnership is one such challenge that the FCN community has accepted and a national workstream is working to create a toolkit for effective academic-practitioner partnership [31].

2. Aims and objectives

With the increased pressure on public services, it is now even more important to ensure that those involved in forensic science practice and research focus their personnel and resources effectively, and working in partnership which has been shown to be successful in other disciplines, such as policing [14]. The overall aim of this research was to determine if academic-practitioner partnerships could address this.

The specific aims of the work described in this paper were:

- To determine the overall benefits of and barriers to partnership between academics and practitioners,
- To determine if the profession of the survey participant affects their responses,
- To determine if experience of research or partnership affects the participants' responses, through the voice of those working within these three groups of professionals -academics, practitioners, and pracademics and their experience at the praxis of both theory and practice.

3. Research methods

3.1. Survey

The method for this study was the use of an online survey [32] with participants from England and Wales [33]. The survey was targeted via social media and email to individuals across the three groups in this research: practitioners, academics and pracademics. The inclusion criteria were anyone working as a practitioner, academic or pracademic in the field of Forensic Science, working for either a Forensic Science provider, a police service, or an academic institution in England and Wales.

The survey was sent to academics at universities with forensic science or related degree courses, and to practitioners known to work in forensic science disciplines. Participants were encouraged to share with others in the field [34]. The selection of relevant social media sites and individuals was purposive to ensure that those who accessed it would have relevant experience and knowledge, to ensure that the data was relevant and reliable [35].

The survey was created via OnlineSurveys.ac.uk, and the link was

distributed as previously described. All surveys were completed anonymously, and no individual is identifiable from the data that is included in this research. The survey included 17 primary questions (the survey is provided as supplementary information in Appendix A) that required a combination of the selection of categorical data and free text comments.

3.2. Analysis

Quantitative and qualitative analysis of the responses focussed on the benefits of and barriers to partnership, with reference to the relevance of the self-classified profession of the participant and their experience of research and partnership.

Statistical analysis of the data was completed using a two-way chi square test to identify any significant differences (to a significance level of $\alpha = 0.05$) between the responses provided by each group of participants, from the questions with pre-populated responses. All four assumptions for a two-way chi square test were met (the variables are categorical, all observations are independent, the cells in the contingency tables are mutually exclusive and the expected values in cells are greater than one) The effect size was of the data was calculated using Phi φ test, with a value of 0.1 considered a small effect, 0.3 a medium effect and 0.5 a large effect [36]. Qualitative analysis was used to interpret the responses to the open questions and the data in the free text boxes. The method used was reflexive thematic analysis [37].

Reflexive thematic analysis (RTA) involves only one coder or reviewer and encourages depth of engagement and reflexivity. The codes that are generated are based upon the researchers' assumptions and interpretations of the patterns of meaning from the data. The researcher makes active decisions and choices based upon reflection of the underpinning assumptions contained within the data. Themes are nor pre-defined but developed.

The first author read the transcripts multiple times, familiarising themselves with the data, and generated initial codes or meanings. These initial codes were short, descriptive pieces of information that provided labels for information, and they evolved as part of the iterative process. These codes were then reviewed, refined, defined and named, and then themes identified before the narrative was developed. There is often overlap between the phases and the themes generated, and the process is flexible and organic. This method was chosen because it is not based within any specific theoretical framework and the researcher plays an active role in the knowledge production. The codes that are generated are based upon the researchers' assumptions (conscious and unconscious) and interpretations of the patterns of meaning from the data, not the number of times something is said. No two researchers are likely to reproduce the same interpretations or findings [38]. RTA provides a method of analysis of qualitative data that is robust and detailed and accessible to all potential audiences [39].

3.3. Ethical approval

Ethical approval for this research was obtained under the terms of Anglia Ruskin University's Research Ethics Policy (dated 1 May 2019, Version 1.10).

4. Results and discussion

There were 56 responses to the survey from across the three disciplines - police forensic practitioners, practitioners from forensic service providers and academics teaching forensic science or related disciplines. The participants self-declared as practitioners, academics or pracademics. 22 participants identified as practitioners, 11 as academics and 23 as pracademics (8 who currently or have worked in academic and policing, 12 academic and forensic service provider, and 3 academic, policing, and forensic service provider).

4.1. Benefits and barriers to partnership

The perceived benefits and barriers to partnership articulated by the participants are summarised in Figs. 1 and 2.

Sharing ideas and knowledge, sharing experience, improving techniques and improving practice were identified as the most likely and desired benefits of partnership. The importance of sharing ideas and knowledge and the benefits to practice that can result from this are widely acknowledged by participants who commented upon the importance of "constant collaboration" and the benefits that sharing the outputs of academic research bring.

Participants considered that spending time with others, developing a "free interchange of ideas", and the prioritisation of those ideas into impactful initiatives, as key benefits of partnership. Sharing ideas and knowledge (knowledge exchange), is an important measure for both policing and academia [40]. Participants also opined that partnership would improve the quality of research outputs, increase the legitimacy of the research, and increase the opportunity for research funding. Research benefits were commented upon many times in the free text comments, with participants stating that research they had been involved in had supported a new technique or the validation of a new piece of equipment. 11 % of participants selected 'other' and in the free text comment's beneficial themes were identified including (i) a better understanding of other disciplines and roles, (ii) improved investment in people, (iii) improvement in expert evidence within the criminal justice system and (iv) an improved student experience.

Free text comments highlighted the appeal for participants from all three roles to engage in open, honest and equal partnerships with clear communication and transparent policies and processes.

In terms of barriers to partnerships, financial barriers were identified most frequently by participants, with institutional and cultural barriers the next most frequently cited. The free text comments added by participants who selected 'other' included (i) lack of money, time, and resources as the biggest barriers to effective partnership, along with (ii) reluctance or inability to share information. Time, or rather the lack of it, was a frequent response. Participants did not think that their employers would give them the time to effectively introduce a partnership and that operational demands would always take priority.

Lack of understanding of the other role, and lack of respect for the other role, were also perceived as barriers. Participants were asked about what would be important to them in partnership and there are frequent references to the need for trust, respect, honesty, understanding and clear communication, all of which may positively impact the lack of understanding and respect perceived as existing. This lack of understanding and lack of respect would negatively impact the sharing of experience, ideas, and knowledge that participants valued so highly as a benefit of partnership.

There were many comments made in relation to challenges in the formation of relationships. A participant who had made the transition from policing to academia felt that there was "resistance from academia to provide partnerships". Academic participants stated that "practitioners often have useful data but don't have either the time or the inclination to conduct research", and also stated that policing is not able or prepared to share data. A practitioner stated that academics should "spend time with practitioners and not always expect practitioners to go to them".

4.2. Does profession affect the participant's responses?

The profession of the participant (practitioner, academic or pracademic) was analysed in relation to the responses to questions. Table 1 lists responses selected by the participants in relation to the perceived benefits of partnership and Table 2 the perceived barriers to partnership. It is interesting to note that academics perceived the benefits of improved practice, improved techniques and improved legitimacy in practice more highly than practitioners. Pracademics also perceived
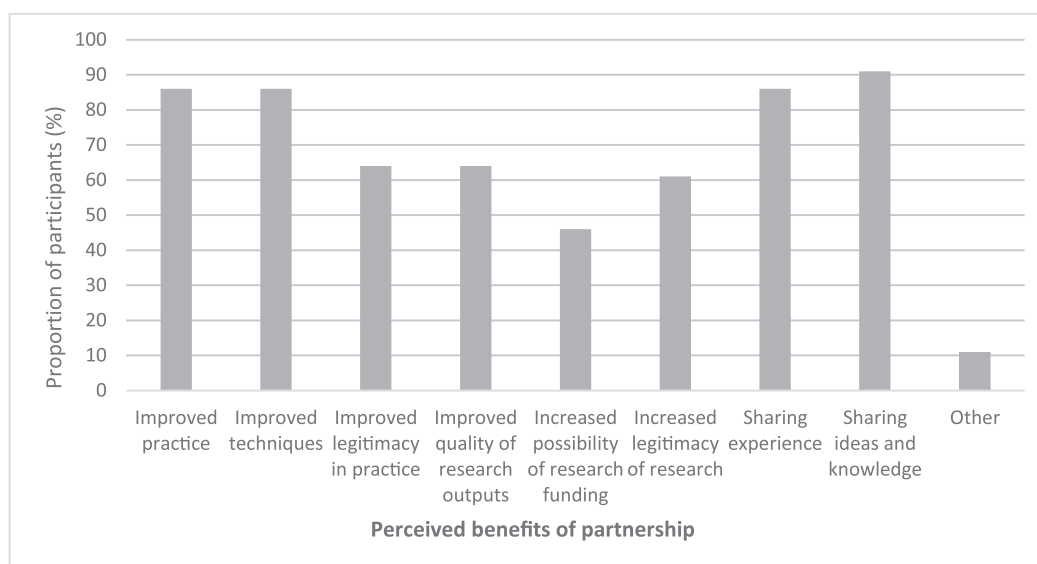
Fig. 1. Proportion of participants who articulated particular perceived benefits from partnerships.
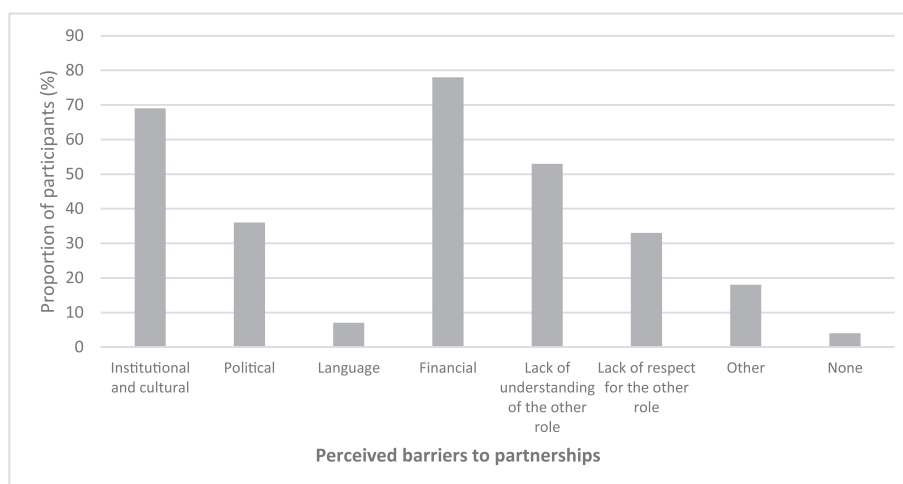

Fig. 2. Proportion of participants who articulated particular perceived barriers to partnerships.

these benefits more highly than practitioners.

Pracademics gave the highest proportional positive response to improved quality of research outputs, improved possibility of research funding, and increased legitimacy of research. Pracademics also have the highest positive responses for sharing experience and sharing ideas and knowledge. Their experience working in both fields means that they may be the bridge between "the ivory tower and the works of practice" as previously discussed. They understand the challenges and capabilities of both sides and so may have a more realistic expectation of what can be achieved.

Free text comments from participants included that there was "resistance from academia" to partnership, "there is a lot of I'm better than you in the academic world' and that "academic institutions do not support practitioners". It is also important to acknowledge that there were also comments in relation to practitioners expecting a "magic box" from research that will have immediate impact, and the challenge that practitioner research may not attract funding. These comments all highlight that a lack of understanding of the other role is a barrier that needs to be overcome.

There was association between the role of the participant and the perceived barriers institutional and cultural (two-way chi square test, x_1^2 = 0.038, n = 56, p < 0.005), and lack of respect of the other role (two-

way chi square test, x_1^2 = 0.003, n = 56, p < 0.005), with pracademics selecting these as a more significant barrier than any other group. The effect size, when tested using phi (φ), was small.

4.3. Does experience of research or partnership affect the participants responses?

Questions 9 (experience of research) to 11 (experience of academic-practitioner partnerships) examined the impact of previous experience of research, and previous experience of partnership, on participants opinion of academic-practitioner partnerships. Participants selected the responses that they considered most appropriate.

The modal responses for research experience were moderate, or above average, whereas for partnership experience it was very limited, or moderate, and 20 % of participants had no experience at all (see Fig. 3). The distribution of the responses suggested that the respondents had less experience of partnership than of research (refer to tables 3 and 4 in supplementary information). This is not unexpected due to the small number of partnerships that exist currently in England and Wales.

Fig. 4 shows that regardless of experience of research, participants had very similar perceptions of the benefits around improved practice and sharing ideas and knowledge.

Table 1
Perceived benefits of partnership in relation to self-classified role of the participant (%).

	Academic n = 11	Pracademic n = 23	Practitioner n = 22	Total n = 56
Improved practice	90.9	87	77.3	83.9
Improved techniques	100	91.3	77.3	87.5
Improved legitimacy in practice	72.7	78.3	45.5	64.3
Improved quality of research outputs	63.6	78.3	50	64.3
Increased possibility of research funding	54.5	56.5	31.8	46.4
Increased legitimacy of research	54.5	73.9	50	60.71
Sharing experience	72.7	91.3	86.4	85.7
Sharing ideas and knowledge	90.9	95.7	86.4	91.1
Other	9.1	17.4	4.5	10.7

Table 2
Perceived barriers to partnership in relation to self-classified role of the participant (%).

	Academic n = 11	Pracademic n = 23	Practitioner n = 22	Total n = 56
Institutional and cultural	54.5	86.9	54.5	67.9
Political	36.4	39.1	31.8	35.7
Language	18.2	4.4	4.6	7.1
Financial	72.7	87	68.2	76.8
Lack of understanding of the other role	45.5	60.9	50	53.6
Lack of respect for the other role	27.3	56.5	9.1	32.1
Other	9.1	30.4	9.1	17.9

Participants with more than average, or extensive experience of research perceived improved legitimacy in practice as a benefit, and those with moderate, more than average, and extensive experience of research perceived increased legitimacy of research as a benefit of partnership. This indicates that those who have previous experience of research and/or partnership are more likely to be able to anticipate the potential benefits.

Statistical analysis supported this evidencing that there is association between experience of research and the benefits of partnership in relation to the responses 'improved legitimacy in practice' (two-way chi square test $x_1^2 = 0.034$, n = 56, p,0.05) and 'increased legitimacy of research' (two-way chi square test $x_1^2 = 0.03$, n = 56, p,0.05) with the effect size using phi (φ) small.

Fig. 5 shows that participants experience of partnership had little effect on their perceptions of the benefits around improved practice, improved techniques, sharing experience, and sharing ideas and knowledge.

Participants with more than average, or extensive experience of partnership perceived improved legitimacy and increased legitimacy of research as a potential benefit of partnership. This association was also statistically significant (two-way chi square test $x_1^2 = 0.008$, n = 56, p,0.05) and again the effect size using phi (φ) was small.

It is interesting to note that those with experience of research are less likely to perceive that there is an increased possibility of research funding than those with experience of partnership. There may be related to the type of funding available and the different perceptions of what "funding" constitutes, particularly "blue chip funding" (e.g., research councils) between academics and practitioners.

Figs. 6 and 7 show that regardless of experience of research or partnership, participants identified the same barriers with (i) institutional and cultural and (ii) financial, as the most likely barriers to partnership, with (iii) lack of understanding of the other role and (iv) political factors also considered important.

Those with the more than average, and extensive experience of research, are most likely to perceive financial challenges as one of the barriers to effective partnership. Those participants may have experience of how difficult it can be to obtain funding, and how expensive and time consuming it can be to complete research. It is important that during the design and preparation phase of a partnership that all partners are clear and open about the financial implications, the expected resource commitment, and the capabilities of every one involved.

5. Thematic analysis of free text comments

The survey also included questions that required free text answers. Reflexive thematic analysis was conducted to develop, analyse, and interpret patterns in this qualitative data as described previously.

5.1. Identification of themes – the three 'R's'

Three key themes were identified from the analysis of the participants responses as being important for successful partnership. They are interconnected and continued to be developed through each of the analytical phases.

These are the need for effective communication and the development of a **Relationship**; the **Relevance** of the partnership to the participant's role; and personal **Reward** such as improved practice or better research to those involved; the three 'R's'.
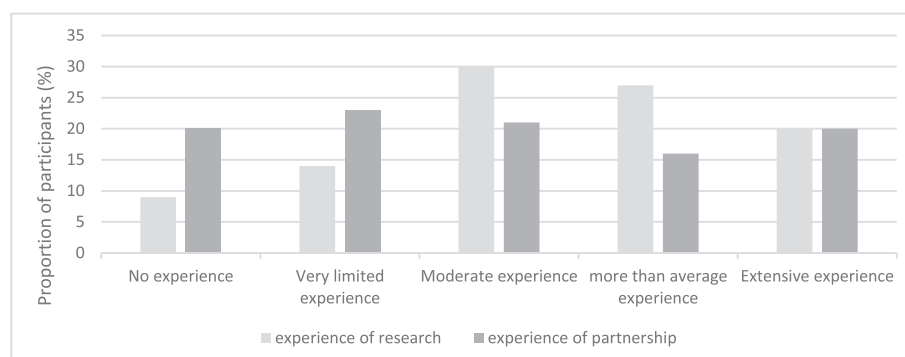
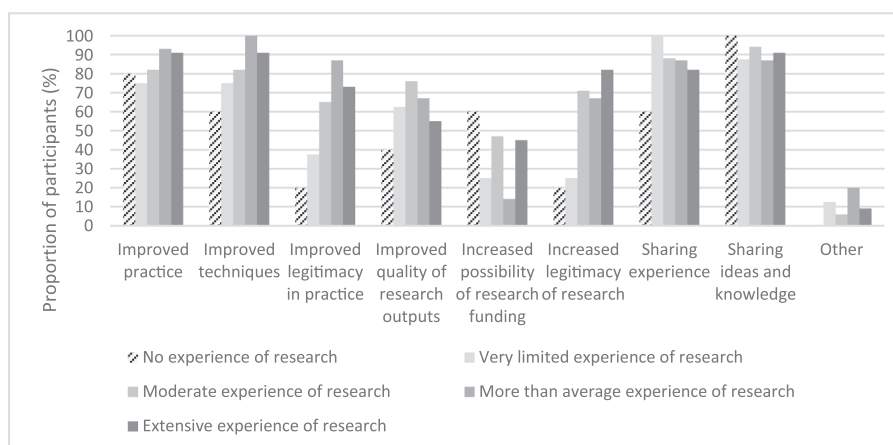**Fig. 3.** Participant experience of research and partnership.

Fig. 4. The impact of **experience of research** of participants on their perceptions of the **benefits** of academic-practitioner partnerships.
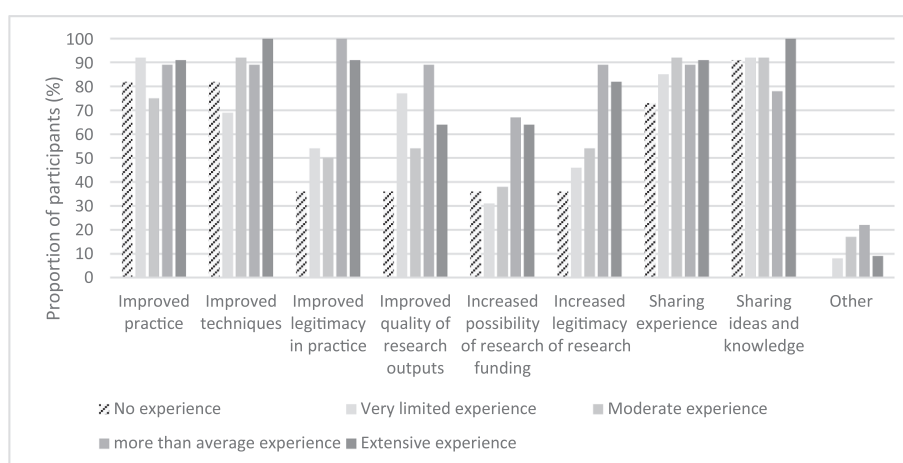

Fig. 5. The impact of **experience of partnership** of participants on their perceptions of the **benefits** of academic-practitioner partnerships.
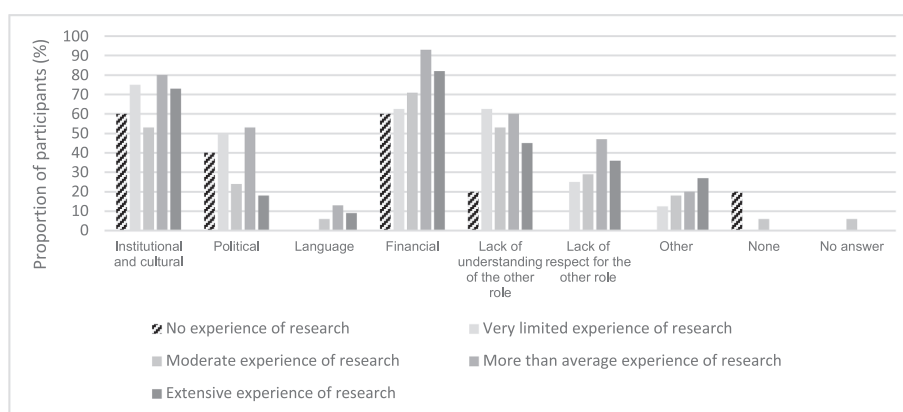

Fig. 6. The impact of **experience of research** of participants on their opinions of the **barriers** of academic-practitioner partnerships.

5.2. The development of a **Relationship**

The first theme identified was the need for effective communication and the development of a **Relationship** to ensure that partnerships are effective. The idea of practitioners and academics not being able to work together was challenged by Bartunek and Rynes, 2014 [18]. They identified that communication and understanding of the other roles was an obstacle that had to be overcome. This sentiment is echoed by the comments received from participants from all three groups in this research which highlighted trust, respect, flexibility and openness, integrity, and honesty. Comments such as the need for the "experience to be a good one", and the importance of understanding each other's roles were recurring.

That a successful partnership could be achieved by ensuring that there is a clear partnership agreement or memorandum of understanding in place that includes the ethical boundaries, the key performance indicators, and the objectives of the partnership. was a view that was posited by all three roles. Comments included those such as the need for
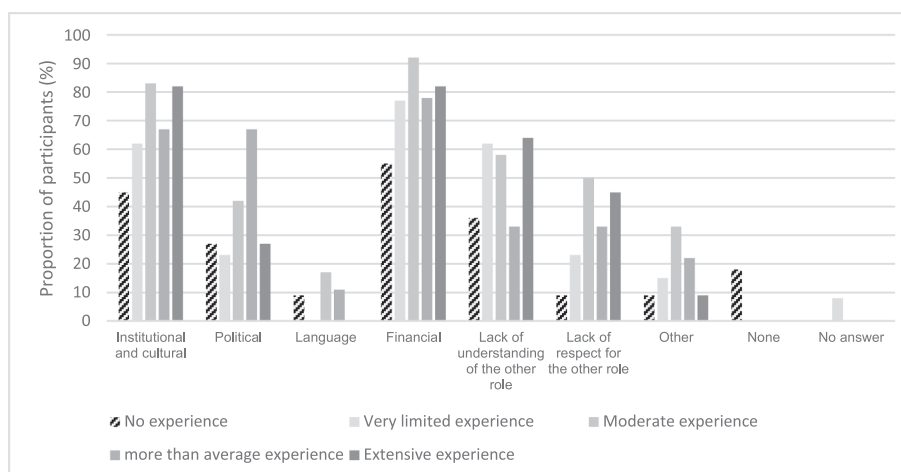
Fig. 7. The impact of **experience of partnership** of participants on their opinions of the **barriers** to academic-practitioner partnerships.

"mechanisms of interaction", memoranda of understanding that were clear and mutually beneficial to all.

There was acknowledgement that all partners brought different benefits and an understanding of the value of each partner brought a closer working relationship. In this research one academic commented on the importance of ensuring that there was personal buy-in from practitioners for partnership to succeed, and that academics should ensure that they "show appreciation to practitioners". They felt that this could overcome the perception/reality of academic snobbery that some felt was exhibited towards pracademics and practitioners. However, it is important to acknowledge that this ignorance can also extend the other way and it is important that there is mutual respect. Oliver et al. [40] commented on the importance of clear and effective communication, clear working guidelines, respect and lack of assumptions being made for effective coproduction of research. One pracademic stated that there needed to be "a good first experience" which indicates that if the first interactions are not successful then collaboration will be more difficult. Another noted that as the partnership continues, there should be equitable input and travel with practitioners attending universities and academics visiting police premises.

5.3. The **Relevance** of the partnership to the participants role

The second theme identified related to the content and structure of the partnership.

Participants included time, personnel and resource constraints as being challenges to the success of partnership. Austerity and the cuts that resulted from it have had an impact on what all groups can do in relation to innovation, creativity, and research due to lack of personnel, time, and finances [41].

There is acknowledgement that partnerships will need to be realistic and have clear guidelines and expectations stated at the start. Furthermore, practitioners were concerned about the lack of time that they had to invest in the development and organisation of a partnership and the timescales for work to be completed with operational demands. Practitioners also commented more than other groups that partnership development should include transparency about the resources and personnel, funding and governance structure that would be needed. All three groups referred to how the partnership should have value to both parties, with the development of techniques that had a 'real-world' application and an interchange of ideas, with opportunity for all parties to provide input, ensuring relevance to their organisation and roles. Some of the practitioners' biggest reservations related to the lack of relevance of research, so it is important that for a partnership to be successful any research undertaken is discussed and agreed by all parties and will have real world application and impact.

Partnership was seen by some as an opportunity to invest in the development of the workforce, with the possibility of further study for practitioners and an opportunity for academics to ensure that they remain up to date with current practice and procedures. Rudes et al. [13] conducted research in criminal justice where they established that to maintain partnerships they needed to be based upon clear objectives, agreement and include regular feedback. There was a positive reaction to the possibility of partnership improving performance, research, and practice for all, adding value to all parties. Practitioners stated that they would require partnership to positively impact on operational performance, improve service delivery and be compliant with quality standards and validation requirements.

5.4. The benefit of personal **Reward** such as improved practice or better research

The final theme relates to the institutional and personal rewards from effective partnership. It was clear from the comments received that all parties would be more engaged and vested in a partnership if they could see the clear benefits to themselves and their organisation and profession. These rewards would not be personal financial gain but may include research funding or at least the opportunity to apply for joint funding; research outputs and impact; improved practice; and ultimately improved service to the public. Bumbarger and Campbell [42] identified that partnership working resulted in better informed research that was applicable to real world situations. It is also acknowledged that partnership in some areas has resulted in more effective integration of research into practice [43] and that public safety could be improved [44].

Practitioners commented that partnership is "relevant in practice and beneficial to them". Comments about the ability to improve practice and potentially streamline practice, saving time and money were also made by practitioners. They welcomed the opportunity to work with others who could conduct relevant research that may improve their practice. One pracademic stated that they felt that UK forensic science was "falling behind", a point also raised by the FSR [1], and that partnership would be a way of addressing this. The opportunity to invest in the development of people and their knowledge, and the cross pollination of ideas and experience was considered by participants as important, with partnership seen as a way for this to happen. Partnership was seen as an opportunity to consider new ideas and methods and to develop and validate new techniques, but to be successful there needed to be "clear mutual benefit for all parties involved". This reward for all involved is important with the reward not being personal or fiscal but professional in relation to the involvement in research, the improvement of their practice or the opportunity to embed scientific advances into

their practice. Pracademics included shared publications, research outputs, the exchange of material, the development of regional, national, and international partnerships as important benefits to them.

Academics were keen to be able to access information and resources to increase the impact of their research. Partnership may also provide access to research funding that would not be available for academic institutions alone. They saw partnership as a way to ensure that practitioners complied with scientific protocols, and a means to ensure that their research was relevant to actual casework. Partnership was seen by practitioners as a method to learn about research and test new methods, enhance their education, improve operational delivery with scientifically tested methods and a way to improve their personal performance. Overall, the rewards included were personal development, enhanced performance in research or practice and enhanced service delivery.

5.5. Other comments offered by the participants

The opportunity to offer further comment about partnership elicited some particularly interesting responses and reinforced the comments made in the previous three sections. A practitioner responded that "This is the way forward", and another that partnerships should be created at a regional, national, and international level. The work of the FCN in England and Wales is addressing this challenge on a national level and changes in policing operational delivery models have created regional partnerships within policing, however there is still room for further development such as is seen internationally in Australia for example with the University of Technology Sydney taphonomy facility which is a partnership between universities, scientific organisations and law enforcement agencies [45].

Another comment was about the importance of Practitioner Academics or pracademics who have experience of both areas and how they would make partnership more successful. There were several participants who stated that this research was much needed and timely and that they were grateful for the opportunity to provide their opinions.

6. Reliability, validity and generalisability

Many comments highlighted the importance of a national approach or national facilitation for partnership. This survey was conducted in 2020 and since completion the FCN has established a workforce strategy with partners from across the forensic community working together to identify best practice and create a toolkit for effective partnership [17].

Some research posits that academic rigor and relevance to practitioners are mutually exclusive [46] and will also be diluted if the focus of the research is on one partner only [47]. It is important to recognize though that research that is valuable to academics and research that is valuable to practitioners is not necessarily mutually exclusive. It can, and should, be complementary and a successful collaboration with good research design will be beneficial to all involved [48]. The method of formation of partnerships is very important [49] with the need for discussion and agreement in relation to group dynamics and early establishment of clear aims and objectives. To be effective there needs to be a true collaborative partnership established that is built upon trust, shared visions, and values, communication, and power sharing [50]. Truly effective research should support practitioner's engagement in research and create researcher focus on the benefit to practice. It is important to recognise that multiple realities exist, and that personal experience affects a participant's perception of partnership. Therefore, a subjectivist and interpretivist approach are widely used and the impact of individual biases – conscious and unconscious - must be considered. The methodology and methods chosen for this research are academically acceptable practices that are valid and reliable and there is some generalisability to other similar disciplines.

7. Conclusion

Establishing successful, respectful, and professional relationships, which include clear communication, trust, and openness are very important to the success of partnerships. The aims and objectives of the partnerships need to be realistic and relate to the real world, any results need to provide improvement in the legitimacy of practice, developing new techniques or streamlining practice, and need to produce research outputs that have impact on practice, for society and may influence policy and procedure. Finally, partnership needs to be rewarding to all involved. This reward can be in various forms: funding; research outputs; improved techniques; a chance to develop skills; education; but it is easier to achieve the 'buy-in' needed if those involved can see the benefit to themselves, the 'reward' or personal benefit.

This research provides valuable and much needed information in relation to what all participants would like to see in an effective academic-practitioner partnership and provides guidance in how partnerships should be developed in the future. It will aid the progress of workstreams, such as those facilitated by the Forensic Capability Network, as they progress their work in relation to academic-practitioner partnerships.

Declaration of Competing Interest

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

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.scijus.2022.11.005.

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