



Essentials of Scientific Communication in a Productive Research

E. O. Nwaichi^{1,2*} and B. W. Abbey²

¹Department of Plant Soil and Insect Science, University of Massachusetts Amherst, USA.

²Department of Biochemistry, University of Port Harcourt, Nigeria.

Authors' contributions

This study was carried out in collaboration between both authors. Author EON designed the study, wrote the protocol, and wrote the first draft of the manuscript. Author BWA managed the literature searches, analyses of the generated data and using her office of 'Research and Development', managed the data processing and storage. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JSRR/2015/16691

Editor(s):

- (1) Robert G. DelCampo, University of New Mexico, Anderson School of Management, New Mexico.
(2) Diana E. Marco, Professor of ecology, National University of Cordoba, Argentina and Researcher, National Research Council (CONICET), Argentina.

Reviewers:

- (1) Anonymous, Ghana.
(2) Vivian Vimarlund, Jönköping and Linköping University, Sweden.
(3) Anonymous, University of health and Allied sciences (UHAS), Ghana.
(4) Anonymous, Chongqing medical university, China.

Complete Peer review History: <http://www.sciencedomain.org/review-history.php?iid=1131&id=22&aid=9575>

Original Research Article

Received 11th February 2015
Accepted 29th April 2015
Published 4th June 2015

ABSTRACT

Addressing disputes of everyday moral diversity in research and related activities embraces concepts-of-right-and-wrong conduct. To transmit scientific information and theories, besieging gaps abound. Various communication tools have been explored to address exchange of information among researchers in our continual search for systematic creative work, undertaken to increase the stock of knowledge, and the use of this stock of knowledge to devise new applications.

Keywords: *Research network; scientific communication; knowledge; productive research.*

*Corresponding author: Email: nodullm@yahoo.com;

1. INTRODUCTION

Research (simply, to go about seeking) comprises "creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications. It is a panacea to establish or confirm facts [1,2], reaffirm the results of previous work, solve new or existing problems, support theorems, or develop new theories. A research project [3] may also be an expansion on past work in the field. To test the validity of instruments, procedures, or experiments, research may replicate elements of prior projects, or the project as a whole. The primary purposes of basic research (as opposed to applied research) are documentation, discovery, interpretation, or the research and development (R&D) of methods and systems for the advancement of human knowledge. It is noteworthy to state that Research is not limited to scientific fields [4] but also humanities, artistic, economic, social, business, marketing, practitioner research, etc. with varying epistemologies (study of nature and scope of knowledge – what is knowledge, how can it be acquired and the extent to which it can be acquired) – based approaches.

Professionalism constitutes the conduct, aims, or qualities that characterize or mark a profession or a professional person. It also includes the following of a profession for gain or livelihood. A related distinction for profession from trades or crafts would be that a professional does mainly mental or administrative work, as opposed to engaging in physical work. Most professionals are subject to strict codes of conduct enshrining rigorous ethical and moral obligations. Professional standards of practice [5] and ethics for a particular field, are typically agreed upon and maintained through widely recognized professional associations [6].

Networking is the exchange of information or services among individuals, groups, or institutions; specifically: the cultivation of productive relationships for profession, employment or business. Research Networking (RN) involves using web-based tools to discover and use research and scholarly information about people and resources and exist for research activity and constitute a more cost-effective method of generating new ideas. This is because Networking is a low-cost activity that involves more personal commitment than money.

In the case of a formal network, its members may agree to meet weekly or monthly or via the internet with the purpose of exchanging ideas and referrals and building relationships with fellow members. They can provide operating support to organizations, and related value chains and value networks especially and monitoring and evaluation [7] steps. In Networking, groups of like-minded researchers recognize, create, or act upon research opportunities. RN tools facilitate the development of new collaborations [8] and team science to address new or existing research challenges through the rapid discovery and recommendation of researchers, expertise, and resources.

A group of people working together in an organised way to carry out specific task(s) may be referred to as a network. It is a group of people working towards a common goal and may be large, small, ad-hoc, or permanent. Research networks involve academic, professional, experienced staff, early career staff, support staff, manager, administrator, full – time and part – time staff. Such heterogenous composition requires some mechanism of information flow to handle inherent complexities, risks, competition and priorities, resources and legal protection.

Research Ethics is a branch of philosophy that involves systematizing, defending and recommending concepts of right and wrong conduct, often addressing disputes of moral diversity in research and related activities. It investigates what the best way is for Research proposal, design [9] and methodology, management and evaluation and deduces what kind of actions are right or wrong in particular circumstances. Ethics seeks to resolve questions dealing with human morality—concepts such as good and evil, right and wrong, virtue and vice, justice and crime. Richard Paul and Linda Elder of the Foundation for Critical Thinking define ethics as "a set of concepts and principles that guide us in determining what behavior helps or harms sentient creatures." In the same vein, Research Ethics provide guides to measure [10] what helps or harms Researchers. Empirical findings of increasing editorial delays, decreasing acceptance rates at journals, and a trend toward longer manuscripts has been identified by Conley et al. [11] to diminish productivity among young researchers.

With the collapse of lone research for its synergistic counterpart, an increasing craving for a more systematic and sustainable approach to

working together in a research network among scientist is gaining popularity. Research networks constantly consciously or unconsciously, exchange information to drive professionalism, research ethics, planning, design, implementation, study, documentation, discovery and its interpretation [12], the research and development, fund drives, etc, leading to a productive research. Scientific communication is therefore the systematic impartation or exchange of facts provided or learned through observation and experiment in a unique, timely and acceptable manner. Such facts could include objectives, facilities, structures and control, legal framework, research interest, technical and management support options, etc. If awareness levels are low then research network members will suffer more irreconcilable conflict, dampened growth or dearth of skilled specialist because there is less known motivation and justification such relationship.

The objectives of this study include to explore a rewarding and fundamental balance between research networks and their outputs, and between their operability and effectiveness. This in effect will examine the relationship between the effectiveness of research networks and the productivity of involved researchers as regards the place of communication in such relationship.

2. MATERIALS AND METHODS

Four research networks, RNs in four countries (Nigeria, South Africa, Poland and United states) from different continents were identified and chosen randomly for this study based on consent agreement and consistency in provided information. We surveyed the member participants between ages 25 and 55 while collecting data. Institutions where studies were carried out included University of Ibadan Nigeria, University of Western Cape South Africa, Institute of Agrophysics Lublin Poland and State University New York US. Informed consent and information sheet were distributed to participants at the first meeting to acquaint them with more information concerning our identity, the study, their roles, risks, their freedom to opt out at any time, end use and data custodyship. Questionnaires were administered to RN members and mean results from returned ones, interviews and discussions were statistically analysed using STATISTICA version 10. Studied Research networks member strength ranged from 4 to 10. Quality -checking of data was done and statistical analysis were done with most

consistent four (4) from the earlier stated range of 4 to 10. Means of four most consistent replicates were used to calculate the standard error of mean as displayed in results. Focus group discussions and key informant interviews were run before and after administration of questionnaires, to enable effective comparison and judgement, following informed consent. Obtained data were backed up and backups stored in a location separate from the original. Workstations and storage devices were activated with locks and accessed by only – need – to know personnel. Windows latest updates were done to improve the stability of our software. Productivity were defined by RN members based on invention disclosure, patents issued, publications, social responsibility, spin – offs, membership sustainability, grants attracted, presentations at conferences, structure and documentations. It is important to state that network identity, job title, specific age, gender, length of service for its members were withheld for anonymity and confidentiality. The higher institution where they belong was unanimously agreed as pseudonym in this study.

3. RESULTS AND DISCUSSION

Fig. 1 projects communication and vision as the top – most factors among others, millitating against the ‘growth’ of RNs. This may have arisen based on aforementioned heterogenous composition of a RN. The pace of development in all study areas significantly ($p \leq 0.05$) influenced the strength of most identified barriers to emancipation of RNs (Fig. 1) by analyzing variance. Information technology, gender and proximity in distance (for places of abode) were markedly higher in african countries than others, as millitating factors to the productivity of RNs and may be connected to attendant developmental factors. Day and Gastel [13] have stressed the need for participatory communication.

In their study, NACETEM [14] identified lack of funding (Table 1) as the highest impediment to tangible research and development and our results shown in Fig. 2 depicts the premium placed on communication for accessing policy makers. Poor policies and frameworks in research and development may be directly related to scientific communication [15]. In order to constitute a reliable RN therefore, goal (what we want to acheive), size, criteria (gender, age, socio-cultural diversity, etc?), profession/ vocation, duration (ad-hoc or permanent),

availability of proposed members, adequate information to members (background data, reports, etc.) and detail on expected outcomes, must be laid bare – communication. Across all case continents, ‘influence’ was rated high as an important factor to accessing policy makers thereby creating better opportunity for effective and reliable networks.

Communication, mentorship and reputation of a RN stood tall from this study (Fig. 3) evenly among respondents as major driver to researchers to in choosing a network to join. It therefore behoves on founders of RN to the process of enabling networks to build their networks on goal (discuss, clarify, review), roles (who will perform what tasks?), attitudes (how do we feel about working together on this assignment?) and resources/resource control. Sentiments such as religion, culture, recommendations and opportunism as well as mentor’s prescription were most peculiar to african RNs (Fig. 3) at influencing the choice of RN to join. Haggard et al. [16], in their study, demonstrated the role of mentors and its implication is a research marketplace. However, competency and integrity of a RN was more important to researchers from more developed world. Be it basic, applied or experimental

development, information transfer approach has made or marred us’, said a team leader in one of the case studies. Research user [17,8] needs in research entprise must be prioritised in the research community to make it rewarding afterall.

Table 1. Ranking of barriers to tangible R & D

Limitation	% researchers
Lack of funding for research	87
Inadequate supply of electricity	82
Lack of R&D facilities	76
Obsolete facilities	67
Lack of exposure to modern lab skills	55
Inadequate water supply	54
Lack of quality research assistance	50
Inadequate access to recent journals/ library materials	45
Lack of exposure to conferences	43
Inadequate time for R&D	29
Poor attitude to collaboration among researchers	29
Lack of research drive	24

NACETEM [14]

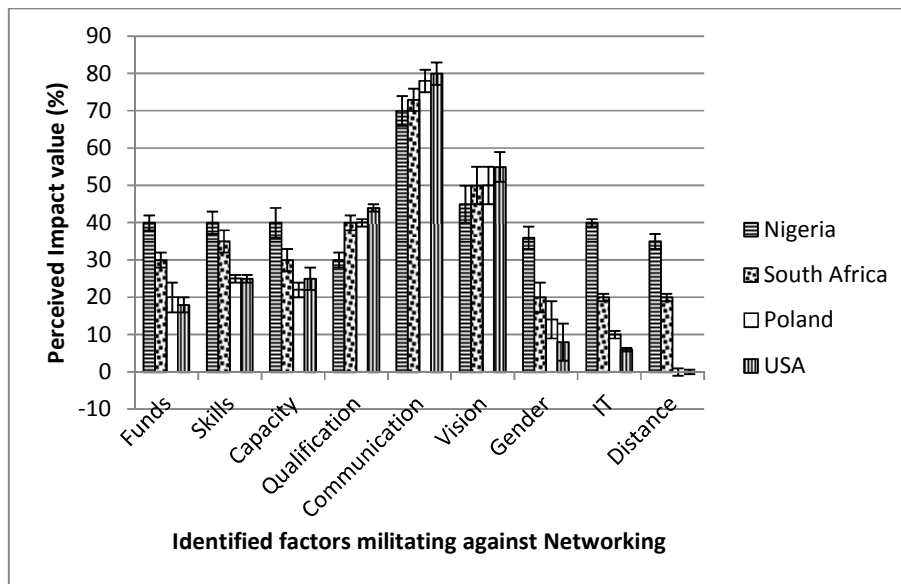


Fig. 1. Disposition of some Research Networks to challenging growth factors (mean±SE, n = 4). "Perceived Impact Value (%)" is the percentage allotted to various factors identified by participants on the impact of such factors on the growth of their research networks

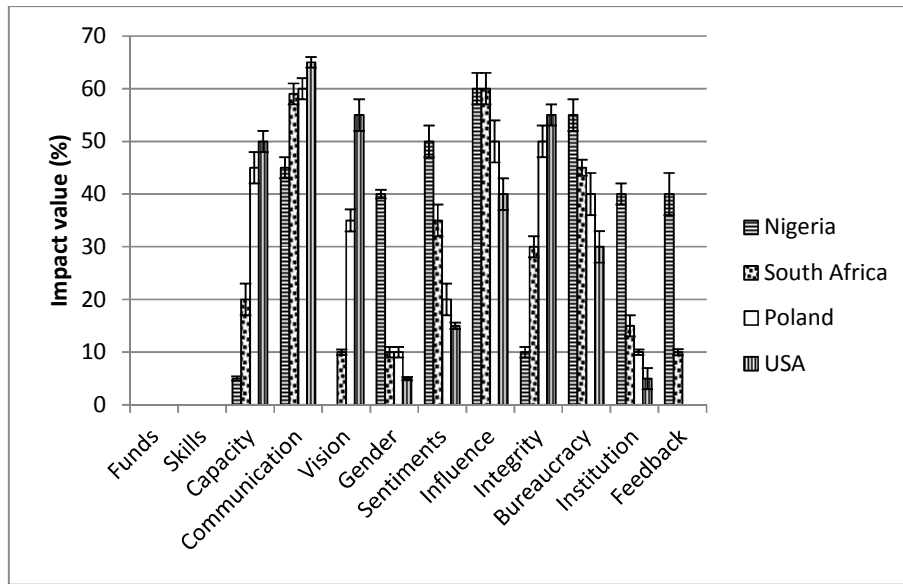


Fig. 2. Factors influencing accessibility to policy makers (mean ± SE, n = 4). "Impact value (%) is the percentage of mean of values assigned to identified factors on the growth and survival of research networks as given by participants

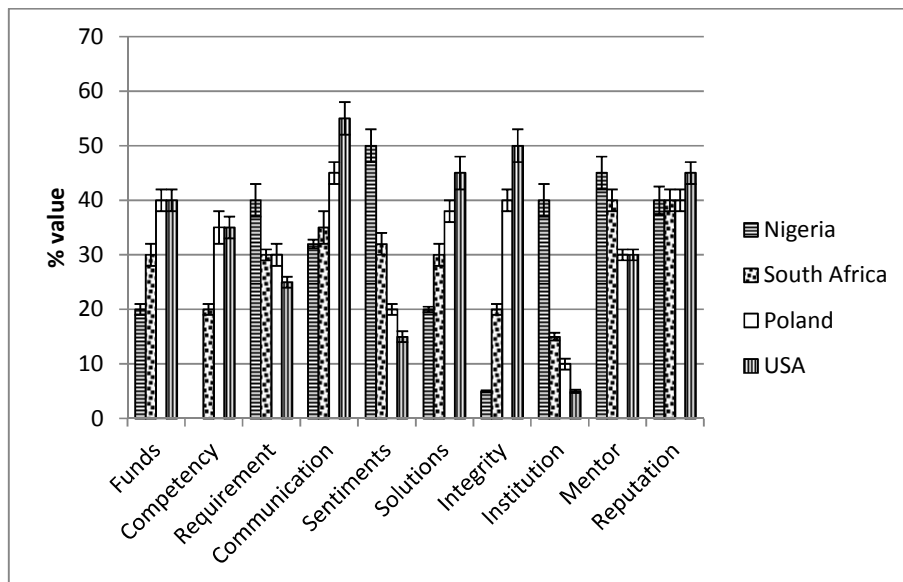


Fig. 3. Disposition of some research networks to membership (mean ± SE, n = 4). "% value is the percentage of mean of values identified by participants as 'drivers' or factors that researchers consider to enroll in a network

Key informant interviews revealed that most research networks were unproductive owing to their inability to withstand any of the developmental stages (Fig. 4) outlined. Performance of any RN usually peaks after increased trust among members, resulting from well communicated goals, that calms the usual

norming frictions. A RN leader as a presenter or communicator, must therefore develop content, structure, delivery style and presence (Fig. 5) to effectively communicate goal, being mindful of entry and appropriate language register. A presentation showcases the speaker's personality and allows immediate interaction

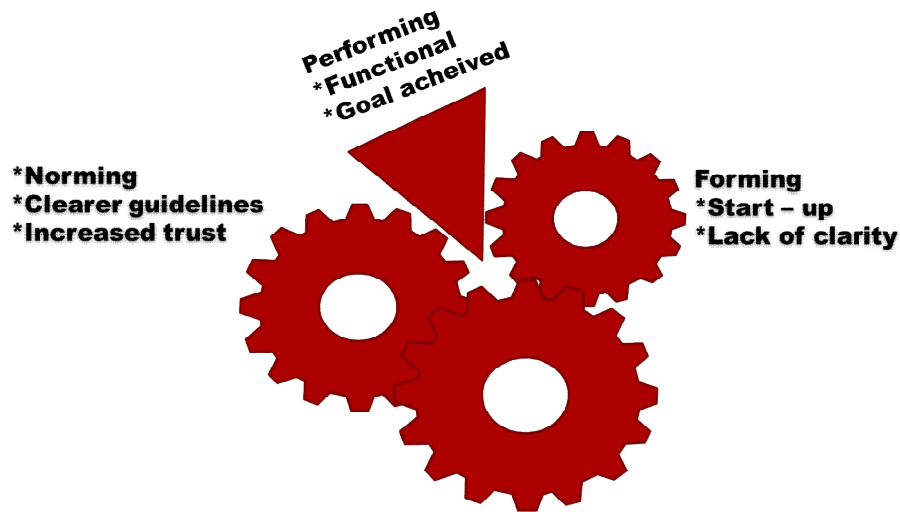


Fig. 4. Stages of development in a productive research network

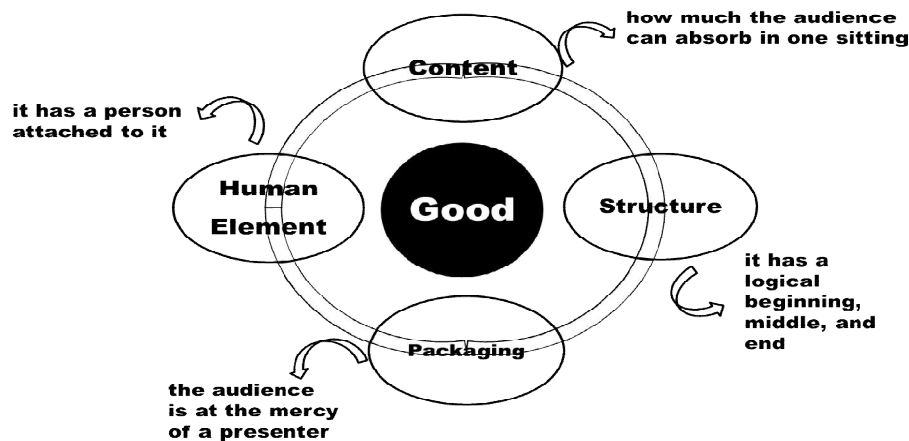


Fig. 5. Scientific communication approach

between all the participants and may be exploited by RN leaders to carry members along and to survive the developmental stages demonstrated in Fig. 4.

Teams do not become effective merely by working together over a period of time; when individuals come together from different cultures, having different ideas, expectations and feelings about why and how certain things should be done, there is a likelihood of conflict. Communication – based resolution approach will revitalize existing RNs, a preferred route in research, as prescribed by World Bank [18], to forming new ones.

4. CONCLUSION

Results obtained from sixteen (16) research groups from four (4) countries in different

continents identified effective communication as the fulcrum of a productive and sustainable research network and research. Nature, goal and target constitute traits of research and hence should be individually woven into consideration when adopting a scientific communication style and structure in a research network. Given a more informed members of research networks, improved funding, usefulness to the society, industry relevance, research culture, university rating and overall fulfilled staff, are deliverables.

ACKNOWLEDGEMENTS

The authors are grateful to UNESCO L'oreal International Fellowship For Women in Science 2013 and Prof. J. A. Ajenka for the platform and exposure. Studied RNs are acknowledged for freely and willfully participating.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Smith JA, Torres L. The process of establishing a new Master of Research Administration program. *Res Manag Rev.* 2011;18(1):1–19.
2. Deem R. Herding the academic cats: The challenges of managing research in the contemporary UK universities. *Perspectives: Policy and Practice in Higher Education.* 2010;14(2):37–43.
3. Beasley KL. History of research administration. In Kulakowski, E. And Chronister, L. (eds). *Research Administration and Management.* Sudbury, MA: Jones and Bartlett. 2006;2–29.
4. Lategan LOK. Managing Research. In: Lategan, L. O. K. and Lues, L. (Eds.). *Doing Research: A general overview of the research processes.* Danhof Teskshor BK. 2005;11–18.
5. Balkhi S. *Huffington Post*; 2013. Available: <http://www.huffingtonpost.com/syed-balkhi/effective-communication-t1b3672210.html> Accessed 12th June 2014.
6. Green J, Langley D; 2009. Professionalising research management. Available: <http://researchdatatools.com/findingsandpublications.php> Retrieved 29 December 2013.
7. Abe CV. *Monitoring and evaluation: A panacea for quality assurance in higher education.* Stirling – Horden Publishers Ltd, Gaaf Building. Oyo road Orogun Ibadan. 2012;110 – 112.
8. Gregory J. Miller S. *Science in public (Communication, Culture and Credibility).* Basic Books. UK; 2000.
9. Creswell JW. *Educational research: Planning, conducting, and evaluating quantitative and qualitative research (3rd).* Upper Saddle River, NJ: Prentice Hall. 2008;8–9. ISBN 0-13-613550-1.
10. Gauch Jr. HG. *Scientific method in practice.* Cambridge, UK: Cambridge University Press. 2003;3. ISBN 0-521-81689-0.
11. Conley JP, Crucini MJ, Driskill RA, Onder AS. *Incentives and the Effects of Publication Lags on Life Cycle Research Productivity in Economics.* The National Bureau of Economic Research; 2014. Available: <http://www.nber.org/papers/w17043> (Accessed 1st June 2014)
12. Eisner EW. On the differences between scientific and artistic approaches to qualitative research. *Educational Researcher.* 1981;10(4):5–9.
13. Day R, Gastel B. *How to write and publish a scientific paper.* Cambridge University Press 6th Ed. UK; 2006.
14. NACETEM. National Center for Technology Management. *Assessment of R & D Productivity in Nigerian Universities and Research Institutes.* Available: www.scribd.com/doc/43591028/R-D-and-the-Challenges-of-Wealth-Creation-in-Nigeria#scribd 2009. Accessed 12 October 2014.
15. Jankowski J. *Research and Development at America Greeting.* Miami University; 2001. Available: www.linkedin.com/pub/dir/ji/jankowski on 12 December 2013.
16. Haggard DL, Dougherty TW, Turban DB, Wilbanks JE. Who is a mentor? A review of evolving definitions and implications for research. *Journal of Management.* 2011; 37(1):280–304.
17. Grimshaw S, Wilson L. Establishing user needs: a large – scale study into the requirements of those involved in the research process. *Journal of Research Administration.* 2009;40(1):32–48.
18. World Bank Report. *Accelerating Catch – up: Tertiary Education for Growth in Sub – Saharan Africa;* 2008.

© 2015 Nwaichi and Abbey; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:

The peer review history for this paper can be accessed here:
<http://www.sciencedomain.org/review-history.php?iid=1131&id=22&aid=9575>