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Internet technology and the epistemic strategies of scientists in post-apartheid South Africa: Race as a decisive factor



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ABSTRACT

Internet technology is an indispensable tool in scientific research. Prior research confirms the importance of professional activities, professional networks, scientific collaboration and the internet among scientists, academics and researchers. In other words, professional activities, networks and collaboration are relevant epistemic strategies in both the short- and long-term objectives of knowledge production. Variations in these strategies are possible across different categories such as race and gender. Involving academics and scientists ($n = 204$) from sampled institutions in post-apartheid South Africa, this study examines how the use of technology by people in different racial categories influences their epistemic strategies of professional activities, networks and scientific collaboration.

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1. Introduction

Studies have stressed the importance of internet technologies for diverse academic and research strategies such as collaboration and professional networks [1,3,9,10,14,19,29,31]. The use of the internet for research by professionals in sub-Saharan Africa is reportedly low [18]. South Africa has however secured a special place in the continent in internet technology and connectivity. It was the first African nation to be connected to the internet in 1991 (World Bank, cited in Ref. [25]). In the Technology Index, South Africa is ranked first on the African continent (World Economic Forum, 2004, cited in Ref. [25]). The Internet World Stats (2012), referring to the figures for June 2012, ranks South Africa fifth in Africa in the number of internet users. The percentage of internet penetration in South Africa is 17.4 percent compared to 28.4 percent for Nigeria, 35.6 percent for Egypt, 51 percent for Morocco, and 28 percent for Kenya. Studies [4]; Wedcheck, 2000, cited in Ref. [25] also indicate that there is a divide along racial lines

in the access to the internet in South Africa. In terms of the usage of internet by race, according to the 2010 statistics, 63 percent were white, 25 percent Africans, seven percent Coloured and five percent Indians (www.mybroadband.co.za, cited in Ref. [16]). What does this divide express in the usage of the internet in the knowledge domain of the country? How is technology assisting in advancing/hindering various epistemic strategies that researchers adopt in contemporary South Africa? This paper attempts to answer these questions drawing on the data from an empirical study of 204 scientists and academics in the country. Hopefully the evidence from this study will be of use in predicting how technology can be helpful in the future of scientific advancement in South Africa.

Knowledge construction is now recognized as an outcome of collaborative work [33]. Providing an analytical framework, Ref. [33] proposes that collaborative knowledge construction should be based on the notions of epistemic activity and epistemic fluency and the epistemic activities are able to help advance the inquiry in reflective, indexical and contextual ways. Epistemic activities allow us to develop models of learning through networked technologies [33]. Ref. [12] call networks of collaborators epistemic communities. Focussing on the importance of

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trust in collaboration, Ref. [8] argues that collaboration has epistemic advantages and that moral virtues like trust have epistemic significance. In brief, networks and collaboration have epistemic significance.

The internet creates a borderless scientific community and it is crucial for scientists in developing countries to collaborate for scientific development [2]. Ref. [2] study, using a combination of methods among Turkish scholars, identifies networking as one of the factors contributing to collaboration. For this purpose, Turkish scholars have used technology to further establish their networks. Research productivity of Turkish scientists has increased as a result of the Turkish science initiative programmes that encouraged collaboration (Gulgoz et al., 2002, cited in Ref. [2]). Ref. [33] research examines collaboration through the moves the discussants online take in the knowledge creation process. New emerging networks bring about structured and encompassing systems of informational flows [15]. While examining the interdisciplinarity in research collaboration, Ref. [23] employ interdisciplinarity and academic rank as their dependent variables and global innovativeness, gender, work experience, and dynamics of the scientific field as independent variables. Their study shows that interdisciplinary collaboration is not rewarding in the existing structures of the institution where the study was conducted and there is a lack of incentives to encourage such collaboration.

Apart from the above literature a great deal of material deals with the relationship between technology and professional activities, networks and collaboration, explaining how they interact in specific settings [1,5,7,10,11,29,32]. Nevertheless, attempts are yet to be made to understand how these variables play out in the presence of other variables such as gender and race.

Ref. [28] is of the view that political conquest and scientific racism have stunted the growth and development of African knowledge systems. Despite this, a renaissance in the knowledge system is happening with initiatives such as NEPAD (New Partnership for Africa's Development), the African Renaissance, African philosophy and indigenous knowledge systems [28]. Based on the study of academics in five universities in South Africa, Ref. [30] speaks of the conditions by which black and white academics in South Africa engage in their research activities, including their efforts to compete and collaborate for scarce resources. Although there are a few studies on collaboration and internet connectivity [17,20,26,27], none of these explore how epistemic strategies are influenced by the use of internet technology across different racial categories.

The objective of this paper is to examine how the selected epistemic strategies are influenced by the use of existing technologies such as the internet and email and how these strategies and the use of technology differ across racial divisions. Further, it is the focus of the paper to investigate the relationships (or lack of these) between the strategies of professional activities, networks and research collaboration in the use of internet technology. Given the extent of access to information technology in the African continent in general and South Africa in particular, these strategies have implications for the future of scientific research in the country. Strategies, varying from

professional activities to professional networking and to scientific collaboration, are crucial to the future of their careers in the realm of knowledge and science, and technology becomes an indispensable component in this matter. In the current academic environment in South Africa, scientific research is highly valued. Scientists, particularly those based in higher learning institutions, are expected to be research-intensive and productive, as funding from the government is received on the basis of research outputs. In order for them to be productive in terms of research productivity they have to embrace appropriate strategies that will result in increased productivity. Professional activities, networks and collaboration are central to this endeavour. For instance, the National Research Foundation, a key agency that funds research in South Africa, encourages researchers to establish domestic and international collaborations. As Ref. [30] noted, academics in the country are under pressure to participate in research networks that lead to accredited publications. As Ref. [13] report, while there is no relationship between economic performance and research performance in developed countries, there is a significant relationship between these variables in developing countries. Their analysis shows that the performance of the academic research output in South Africa affects its economic growth.

2. Methods

Data used in this paper is drawn from a face-to-face survey that was conducted in the KwaZulu-Natal province of South Africa. In the first stage, all the higher educational institutions and research institutes in key locations of the province were chosen. In the second stage, all the academics and researchers who work in the field of science in these institutions were contacted for the interview. All those who had agreed to participate in the study were interviewed. They amounted to approximately 93 percent of the total number of scientists working in these selected institutions. In the final dataset there were respondents representing a university and seven research institutes within the province. They worked in the teaching and research departments (a total of 22 science departments and research institutes) of disciplines which included the agricultural sciences, engineering sciences, life sciences and natural sciences. All the respondents who agreed to participate in the study were interviewed during 2008–2009.

The study focused on the epistemic strategies that the respondents choose to use in knowledge production. Epistemic strategies are adopted to achieve the outcome of knowledge production. The expected outcomes are not usually short-term ones. Knowledge production by the respondents can be in the form of scientific publications but they are not short-term objectives alone. In other words, these strategies have a long-term effect on the ability of the respondents to advance their knowledge production. The strategies are therefore vital. They are not limited to knowledge production but relate to a successful career in these professions. Drawn from the literature, the key epistemic strategies included in this analysis are professional activities (Table 2)—the work respondents do

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