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Science and not-science in nurse education

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Abstract

Science is under threat from a number of sources. In nurse education a range of discourses have been attempting to marginalise science and to replace it with epistemologies which are deemed to be more appropriate. This paper examines the 'not-science' discourses of postmodernism and feminism and evaluates their importance to nursing through their relationship to, and effect on science.

Introduction

The best thing about giving a keynote address is that no-one referees your paper. You get to speak your mind without having to negotiate your way through the professional niceties of publishing. In your fifteen minutes of fame you can get to be a public heretic, fanatic or even a lunatic. I'm not sure into which of these categories my address today will fall. Maybe all three.

Next semester I thought I might set my students the following assessment task: 'In 2,000 words or less, undertake a post-critical, feminist deconstruction of the periodic table. Extra marks will be given for work which explains what the symbols on the table really mean. All assignments must adhere to the Inclusive Language Guidelines'.

Originally I thought I would tell some of my colleagues I was setting this assignment as a bit of a joke. Some of them I know would laugh like drains. Others, however, would not see the humour. I think this practical joke is actually an interesting metaphor for the dilemmas and paradoxes associated with the place of science in nurse education today. Ironically, the use of metaphor is one of the common strategies of the ideologies I intend to critique today.

I began my career as a nurse educator in 1981. I began teaching in the higher education sector in 1983. In those days, nursing was generally regarded as an applied science and our first college diplomas bore that title. In the early days we had some battles with our science teaching colleagues over the meaning of the word 'applied'. We also had some battles over the number of units which ought to be dedicated to the teaching of science. Some programs even tried to integrate their curricula in ways which broke down the walls between the various branches of science and their application to nursing practice. There was never any question, however, about the fundamental importance of science to the educational preparation of nurses. What has happened in the intervening years has made these early struggles look fairly trivial. Science itself is now under threat from ideologies which cast it as an adversary, an oppressor, or even worse, as irrelevant. The two ideologies I wish to take issue with today are postmodernism and feminism.

Postmodernism and science

To a large extent postmodernism, as an idea, has grown out of a strong discontent with science together with a reaction against the excesses of capitalism and industrialisation

(Rundell, 1990; Turner, 1992). It is believed, by its proponents, that the grand narratives of modernity have lost their credibility, that there is no metalanguage and that the purpose of science is no longer to seek the truth but to augment power (Lyotard, 1984). It is argued that if science cannot provide objective truth, then there is no truth. The basic tenet of postmodernism is, therefore, that there is no truth or fixed meaning and that the metanarratives of modernity, including science, should be rejected (Harvey, 1989; Craib, 1992).

Postmodernism presents itself as a celebration of the multiplicity of individual experiences. Each individual's experience is believed to be as constructed and provisional as any other. Postmodern thought encourages a multiplicity of views of, and approaches to understanding. It maintains that knowledge is contextual and localised and it rejects generalised ways of knowing (Smart, 1992). It therefore rejects science as a concept and scientific facts as little more than biased, contextual artifact. The purpose of postmodern discourses is to demystify and discredit science, to challenge its authority as a way of knowing and to champion ways of knowing which are incompatible with, and even anathema to, science.

Postmodernist influences in nursing

In the nursing literature, particularly the Australian nursing literature, there is growing evidence of postmodernism taking hold of the epistemological agenda. It is virtually impossible to pick up an Australian refereed nursing journal and not find at least one article espousing postmodernist dogma.

The appeal of postmodernism for Australian nurses seems to be based on the rejection of scientific objectivity and the celebration of the value of differing discourses - this is an appealing philosophy for an occupation whose knowledge base and practices have traditionally been viewed as a poor relation to those of medicine. However, while significant effects of postmodernist thinking have appeared in nursing literature related to research and epistemology, there appears to be no tangible evidence of postmodernist thought permeating the workplaces of practising nurses.

Some writers (e.g. Watson 1995) argue that postmodernism can help nurses to return nursing to the artistry of the era of Nightingale by moving it from rationalist scientific approaches towards poetic, aesthetic and imaginary approaches; from fixed categories toward the ontologically authentic; from numbers and facts towards text, meaning and embedded theory. Others (e.g. Lister 1990) believe that humanist, feminist, non-Western philosophies will produce a paradigm shift in nursing, establishing the centrality of 'holistic' care and allowing the empowerment of people to influence their own health.

Some Australian writers in the field (e.g. Hickson and Holmes 1994:12) claim that postmodern thinking has resulted in the 'person' being reconceptualised in terms of "...patterning energy fields, extending beyond the corporeal surface". They argue that the modernist dichotomies between dead and alive, conscious and unconscious, sick and healthy are thereby dissolved. They imply that knowing the person (patient) is necessarily only possible through an exchange or interaction of energy or a 'bumping of souls'. One must presume from reading this material that if the distinction between these dichotomies is no longer relevant, then nurses will no longer need to recognise the difference between such out-dated concepts as healthy and sick or alive and dead.

It is argued (Walker 1994:164) that nurses fear relativism and that this fear has caused nurses to accept "...Congealed dualistic categories such as subjective/objective; quantitative/qualitative; hard data/soft data and theory/practice" which have structured the ways we think and do research. Such arguments aim to produce an epistemological anarchy in nursing which keeps ideas in play so that explanatory and predictive theory cannot emerge. Explanatory theory is seen as hegemonic and therefore as oppressive.

Postmodernism's shortcomings

In the literature outside of nursing there can be found consistent and trenchant critiques of postmodernism. It would seem , however, that nurses are yet to take notice of them. In fact, one of the gravest shortcomings of the postmodernist discourse in nursing is its scepticism about everything else, except itself. Unlike science, which has a tradition of self-doubt, rigorous replication and deliberate attempts to test its theories, postmodernism touts little more than emotive generalities which produce what has been aptly labelled 'philosophical styrofoam' (Gross & Levitt, 1994).

In a thorough rebuttal of postmodern pronouncements about science, Gross and Levitt (1994) make some noteworthy observations:

> *A curious fact about the recent ... critique of science is the degree to which its instigators have overcome their former timidity or indifference toward the subject by not studying it in detail but rather by creating a repertoire of rationalisations for avoiding such study. (1994:6)*
>
> *In each case, there are amateurish errors or efforts to pass off mere verbal tinsel as (actual) knowledge. (1994:80)*
>
> *...lazy minds are happiest with the mere voicing of opinion, or with the easy task of dressing this up to make it look plausible. (1994:81)*

They further note that these non-science and anti-science pronouncements represent in effect a rejection of the heritage of the Enlightenment. They mock the idea that a civilisation is capable of progressing from ignorance to insight (Gross & Levitt, 1994:3). This heritage is not so much in the specific discoveries of great historical figures such as Galileo, Kepler, Newton, Halley, Harvey, Boyle and Leibniz, but in the establishment of a methodology which is "...capable of expanding, modifying and generalising these discoveries indefinitely" (Gross & Levitt, 1994:17). In short, science exists because different people <u>can</u> and <u>have</u> used the same methods to replicate the same findings. The self-correcting principle in science ensures that knowledge which is not verifiable by others of different beliefs and predispositions simply disappears.

There are a number of postmodernist authors who have pronounced on ideas in physics and mathematics, but when these pronouncements are examined by practising physicists and mathematicians, they are found to be "...pompous (and) meaningless; but...well contrived to impress readers whose knowledge of mathematics is superficial or non-existent (Gross & Levitt, 1994:80). Moreover, "...scientists who are genuinely familiar

with the terminology invoked by such declarations...have no choice but to regard the whole business as a species of con-game (Gross & Levitt, 1994:79).

The cultural critics which have been spawned by postmodernism have used its techniques to deconstruct the prevailing epistemological dominance of science as being nothing more than the tool of the ruling elite. The argument proceeds that science is the tool of the powerful and therefore the knowledge produced by science is an instrument for perpetuating that power. Such analysis is championed as providing a basis for liberation of those who believe that they are oppressed by science. There is a clear failure in logic here of course, for it is

> *...pretty suicidal for embattled minorities to embrace Michel Foucault, let alone Jacques Derrida. The minority view was always that power could be undermined by truth...Once you read Foucault as saying that truth is simply an effect of power, you've had it... (Ryan, cited in Gross & Levitt, 1994:82)*

Parsons (1994:23) identifies two serious limitations of postmodernist nursing research. Firstly, she claims that postmodernist researchers have surrendered reliability and "...bathed in the glow of detailed and accurate accounts of their research participants' lives" resulting in "...the absence of a true (valid) base upon which to construct social theory". This she identifies as the 'crisis of legitimation'. Secondly, she identifies the 'crisis of representation' related to the problems of defending representations of research participants as legitimate, rather than merely as constructions of the researcher. Parse's methodology (1990) is the most notable embodiment of this crisis, because it deliberately sets out to take participants' stories through increasing levels of abstraction.

Gortner (1993) believes that a lot of the opposition amongst nurses to positivism and empiricism is due to the inclination of nurses to "...adopt a philosopher of the month" (Gortner, 1993:482). Too many nurses are willing to accept philosophy as dogma. She believes that the critique of positivism and empiricism has been misguided. Modern empiricists, according to Gortner, are concerned with complex phenomena in socially significant problem areas. Unlike postmodernists, however, empiricists are concerned with explanation and prediction. Understanding, without the ability to generalise towards explanation and prediction, is weak knowledge. She argues that non-empiricist philosophies impose more significant limitations on human science development than does empiricism. She asserts that "...an interpretive (hermeneutic) nursing science does not allow theoreticity or the building of theoretical constructs outside of the person and lived experience" (1993:486). Because, it is argued, everyone's lived experience is unique, there can be no generalizations and there can be no explanatory theory. The knowledge of understanding is localised, contextual and essentially impotent. This should not be taken as a criticism of qualitative research in general, as not all qualitative research is postmodernist research. Much qualitative research is positivist in its orientation. The difference between positivist qualitative research and postmodernist qualitative research is that the former can strive to produce explanatory and predictive theory while the latter is unable and unwilling to do so.

Postmodernism is a depressing prospect. It maintains that there are no general laws explaining the world - because all of our explanations are figments of our enculturated imagination. It condemns humanity to undoing the Enlightenment and to re-inventing the Dark Ages.

> *The postmodern relativism and distrust of reason make it impossible for anyone to believe in a better future or in the possible resolution of major societal problems...In openly attacking the concept of ideology but secretly using it to unilaterally criticise the theories (metanarratives) which propose critical concepts of ideology, postmodernism not only contradicts itself but also becomes a convenient ideology of the status quo. (Larrain, 1994:312-313).*

As I have argued elsewhere, postmodernism is at best a distraction and, at worst, an epistemological hoax. Rather than providing nurses with the basis of a way of knowing, it ensures that nothing can be known and if nurses invest too much in it they will fritter away the intellectual inheritance of the next generation of nurses (Kermode & Brown, 1996).

Feminism and science

Alongside the emerging postmodernist influence in nursing literature is a very influential feminist tradition. In places the two ideologies merge, with some writers claiming to represent both standpoints. In other places the two ideologies clash. The concept of oppression is shared between the discourses of postmodernism and feminism, while the attributed causes and solutions often seem to differ.

The key element of the feminist critique of science seems to be that because, in the past, scientific work has been dominated by males, then the knowledge produced by that work is biased due to the unacknowledged patriarchal values which supported it. Moreover, the insights provided by feminism will inevitably improve scientific theory, principally by eliminating errors arising from unconscious patriarchal assumptions (Gross & Levitt, 1994:108-109).

Some authors (e.g. Perry 1994) have argued that science has a patriarchal tradition which has caused women to be excluded from science education. This, it is asserted, has resulted in science being targeted towards the predilections and interests of white, middle-class men.

Other authors (e.g. Horsfall 1994:6), in speaking about the problems of 'objectivity' in science and its incompatibility with feminist research principles, argue that "...the overt or covert use of scientific, or pseudo-scientific, method in nursing research incorporates into each project values and orientations that are likely to be antithetical to most of the articulated interests of nursing". This statement, of course, presumes that science conducted by men cannot produce findings which are replicable if conducted by women, and that this science is antithetical to nursing's interest. This is a fairly strong claim. If it is in fact true, then there is cause for concern. This position automatically dismisses the overwhelming bulk of health and medical research from the purview of nursing. This seems a little alarmist. It should be noted that many of the finest researchers in health sciences are now women who are producing results which replicate and are replicated by the work of male researchers.

One of the problems of the current research effort in nursing relates to what is called "...the articulated interests of nursing" (Horsfall, 1994:6). As I have already argued

elsewhere, the research agenda in nursing is preoccupied with nursing's identity and its oppression, and hardly interested in health at all (Kermode, 1995). There is an enduring reluctance within the profession to tackle mainstream health issues. I would argue that scientific illiteracy may well be one of the causes of this reluctance.

Wuest (1994), in commenting on the technique of concept analysis in nursing research, argues that traditional approaches have stemmed from a reductionist view of reality that values scientific objectivity. She maintains that this is limited and that when the world is viewed through a 'feminist lens' the limitations of objectivity can be seen (1994:577). The issue of objectivity, reliability and validity draw a good deal of comment in feminist nursing research literature.

Hall & Stevens (1991) provide a thorough discussion of the problems of reliability and validity in feminist research studies. The constraints presented by the requirements of reliability and validity may be, they assert, neatly sidestepped by re-defining the concepts to be more palatable to feminist researchers. They argue that because reliability means repeatability and because "...human experiences are unique, particularised, and not always amenable to verification..." it is unrealistic for any study to yield the same results on repeated trials, so reliability is, they maintain, not a useful concept (1991:19). This means, of course, that problems so defined, or at least aspects of them, are simply not accessible to science and may, presumably, never be understood by any means other than intuitive means. They replace the concept of reliability with the concept of 'adequacy'. "Adequacy of inquiry implies that research process and outcomes are well grounded, cogent, justifiable, relevant, and meaningful" (1991:20). They are simply not repeatable. So the problem arises "whose account of a phenomenon do you believe if there are competing accounts?" Once again science is put aside to make way for more agreeable, 'ways of knowing' something. The same authors, like many other authors writing on feminist research reject research that is based on deception of participants. This in effect rules out all double-blind medical research from the purview of feminism. This is a fairly dismissive attitude to take towards one of the most powerful research methods used in health research.

Allen, Allman & Powers (1991) present the view that "...any research that sorts its subjects into either a unitary category of 'women' or dichotomous categories of 'men' and 'women' supports a conceptual scheme that reinforces the material subjugation of women" (1991:50). This seems to be a *carte blanche* denial of the legitimacy of investigating sex or gender based population differences. They believe that modern research technologies encourage people to think of themselves and to construct their experience in the terms and labels produced by research (e.g., 'normal sexuality'). (1991:51). This appears to be a rejection of any research which attempts to aggregate data and produce measures of central tendency from it. It represents a fear of knowing the truth because it might be taken as what 'ought' to be, rather than what is. Unlike postmodernism, which argues that nothing can be known, this argument seems to be saying that some things ought not be known.

DeMarco, Campbell & Wuest (1993) argue that because most research has been dominated by the white, male, middle-class perspective, the findings of such research cannot be representative (1993:29). Moreover, they believe that "...theoretical models can legislate reality, limiting our perspective of the experience we seek to study. In this sense, theoretical frameworks can be used to perpetuate the beliefs of the dominant group" (1993:33). What is not clear in this argument is whether this is an argument

against all theory, or just theory developed by men. If it is the former, then it is also an argument against feminist theory. If it is the latter, then it is an argument against science - we are back to superstition and ritual.

Harding (1987), one of the most cited feminist writers, observed that all research methods can be subsumed under three basic techniques - observation, interviewing or questioning, and examining written materials. This, of course, is quite true and as we know, science is the process whereby different researchers using the same techniques can achieve the same findings - the rest is purely artifact. If the artifact becomes the most significant aspect of the research, however, then the research becomes a form of cultural paleontology, where the researcher is manufacturing the fossils.

Allen, Allman & Powers (1991), in discussing 'analytic' inquiry as an important tool of feminist research, reject the reduction of subjects, persons, and women into parts, but condone breaking talk about women into parts. This obviously constrains much feminist research to the pursuit of artifact - of things in which science is not interested or not willing to tackle.

Feminist criticism seems to be overwhelmingly concerned with metaphor, rather than data. As a consequence of this it is difficult to find concrete examples of data and of theory which is patently wrong because of the sexist means by which it has been achieved. The rhetoric of feminist critique is predominantly fixed in the metaphorical. Some feminist authors have argued, for instance that metaphor plays a central role in the construction of mathematics. When this claim is examined by practising mathematicians, however, it is found to be unsustainable. (Gross & Levitt, 1994:112-116). Moreover, as such claims are examined within the broader scope of science they are equally unsustainable.

> *Incessant linguistic criticism has not yet produced a single revision of the body of serious science. Feminist cultural analysis has not yet identified any heretofore undetected flaws in the logic, or the predictive powers, or the applicability of mathematics, physics, chemistry, or - much complaining to the contrary - biology. (Gross & Levitt, 1994:112)*

There have been a number of attempts by feminists to discredit the products of science, but they have not resulted in revised knowledge or theory. For example the Biology and Gender Study Group has attempted to interpret the science of sperm-egg fusion as an example of patriarchal sexism. It is noted, however, that there is

> *...a vast and serious science of what the egg does - actively - relative to the sperm. It has emerged over the last thirty years, independently of feminist or any other kind of cultural criticism. The important contributions to it have been made by women as well as men, and women are among today's leaders of the field. None of the debates that have raged in it have had anything whatsoever to do with gender or metaphor. (Gross & Levitt, 1994:122)*

There have also been attempts to portray the science of DNA as sexist because it has been construed as a 'master molecule' (see comments on the work of Keller in Gross &

Levitt, 1994:142). Despite this rather puerile assertion, this so-called sexist construction of DNA has had no effect on our understanding of the science of molecular biology.

One of the more contentious aspects of the literature about feminist research is whether men can undertake feminist research. Webb (1993) adequately sums up the prevailing view when she notes that "...the overwhelming majority of writers...take the view that men cannot take part in feminist research as researchers (1993:417). It is presumably acceptable for men to be subjects in feminist research, but not researchers. Likewise, it is presumably not acceptable for men to use feminist research methods with female subjects. This seems to represent an extraordinary constraint on the pursuit of some research questions. It is further evidence that feminist research is simply not science.

Another of the key issues in the literature on feminist research is whether sex/gender difference or sex/gender sameness is an acceptable outcome of the research. There are arguments on both sides. Some writers reject the claim that there are any physiological differences between men and women except for their reproductive systems. They believe that any differences which are perceived come form socially constructed 'gender' and not from physiological 'sex' (see comments on the work of Keller & Longino in Gross & Levitt, 1994).

Mitsunaga (1994), in speaking about the studies which have examined sex differences in behaviour and cognitive functioning observes that some data "...provide an illusory structure for theorising biologically based gender differences in socially valued skills" and that for this reason, sex or gender differences ought not be acceptable as research findings (1994:465). This is an example of attempts to erase difference. Many feminist writers seem to accuse biology of mounting a false argument that differences exist between men and women, and that this belief then props up discrimination against women.

On the other side of the argument are feminists who argue for taking into account the biological differences between women and men. Broom (1995), for instance, describes what she believes to be "...the neglect of women in medical research generally, including research on heart disease...(where) the 'same' disease may manifest somewhat differently in women than in men...(and) optimum management of some conditions may sometimes differ between the sexes" (1995:17). This is clearly an argument for taking sex differences seriously. Interestingly, however, like most feminist criticisms of science, her thesis is purely speculative and not supported by data, probably because there is none available.

Some of the feminist criticisms resemble the early attacks by Goethe against Newtonian physics, in which he argued that scientists could not hope to understand the fundamental phenomena of nature, and in which he rejected the use of mathematics to describe and understand such phenomena. These early arguments were in favour of 'holism' and anti-reductionism, anti-abstraction and anti-experiment.

> *The proposal that a new and better science will emerge from an interactionist holist, nurturant 'feeling for the organism' with which women are supposed to have been endowed - by their nature or by their gender - is in its epistemic effect precisely Goethe's old argument against experiments, mathematics, and abstraction...It is not likely to affect future science any more*

> *than Goethe's sputterings against Newton affected the science we have today (Gross & Levitt, 1994:142).*

Part of the problem which feminism has with science seems to be its conviction that physics is representative of the paradigm of orthodox science. Harding (1986, 1992) is one author who has attributed such a status to physics. There is a tendency to extrapolate that all science derives from a world view based on physics. Physics, of course is a discipline - not a paradigm (Gross & Levitt, 1994:127). It is concerned only with the physical world, and it has developed a range of techniques for examining the physical world. To extrapolate the principles of physical science to all phenomena, including cultural phenomena, is silly. The extent to which other disciplines are 'scientific' in their endeavours ought not be measured by the extent to which they mimic physics, but by the extent to which they allow multiple researchers to replicate and verify their findings. If the findings cannot be replicated, then the knowledge is contestable. This is how science works.

There is a tendency amongst feminist writers to only accept the findings of science with which they agree. If the conclusions are unacceptable then the methods must have been perverted by the patriarchal values which underpinned them. Worse than this, however, is the belief that if science is unavoidably tainted by the values and beliefs of scientists, then we should simply let the values and beliefs that we approve of drive our endeavours (Gross & Levitt, 1994:147). Effectively, this argument echoes the arguments of postmodernists - that science is a myth and that we ought to accept that this is so and do our research in ways which are meaningful only to ourselves.

> *What begins as an epistemological inquiry into science ends as familiar anti-science tricked out in the ambient clichés of the business...It ends with the universal complaint of religious zealots, utopians, and totalisers generally. Science as-it-is untrustworthy. We can't bend it to our political will because, as a powerful institution of the present, compromised world, it is protected...We have heard this from ideologues, politicians, and thought police in various uniforms since Galileo's time. How sad it is that it should now eminate from the scholarly halls of universities and reverberate there among intellectuals who inherit the Enlightenment. (Gross & Levitt, 1994:148)*

Conclusion

This paper has attempted to draw out some of the current critiques of science from within postmodernism and feminism and to demonstrate their weaknesses. Its purpose is to alert science educators who teach nurses to the threats which some nursing literature presents to their endeavours. If the voices which carry these threats become too loud in nursing we may produce a whole generation of graduates who are not only scientifically illiterate, but who harbour and propagate an antipathy towards science. In my view this will be to the detriment of nurses, their profession and the community they seek to serve.

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