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The Dangers of Dance for the Information Systems Discipline

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Abstract:

Neil McBride (2018) asks if information systems (IS) is a science. He perceives several problems with current research practice and attitudes in information systems and proposes that we should treat it as a discipline in the humanities akin to dance studies. However, his proposal does not recognize that IS deals with both technology and humans. Further, he does not consider the different views of science and that one can view information systems as a science of the artificial in which one develops actionable knowledge in accordance with available evidence and uses scientific techniques in part. Failure to apply well-founded knowledge in building and applying technology can have significant adverse societal consequences, and professionals would see it as unethical. Since these considerations scarcely apply to dance studies, it appears a poor model for information systems.

Keywords: Information Systems, Sciences of the Artificial, Actionable Knowledge, Ethics.

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1 Introduction

Neil McBride (2018) asks if information systems (IS) is a science. He perceives several problems with current research practice and attitudes in information systems and proposes that we should treat it as a discipline in the humanities akin to dance studies. Provocative papers such as McBride's can generate worthwhile debate and perhaps McBride intended to do so. However, I argue that McBride proposes a dangerous course that has the potential to negatively affect research and professional practice in information systems, to damage society, and to lead to what some would regard as unethical behavior. I believe that alternative views on the type of science to which information systems belongs exist and that one of these views—that information systems is a sciences of the artificial—offers much more promise for the future of IS research.

Given this perspective, I do not find McBride's (2018) arguments compelling. They rely on sweeping generalizations that lack sound support and rigor. Perhaps most importantly, McBride does not cogently articulate his conception of science and information systems. His failure to consider the differing perspectives of these concepts that exist in the information systems literature compounds this issue. However, even if we acknowledge the problems McBride perceives in information systems, he provides no compelling justification as to why dance studies might resolve these problems and some very strong reasons as to why they do not.

2 What is the "Information Systems Discipline"?

McBride (2018) says that the IS discipline studies humans. Yet, this view is not at all universal. Lee (2001, p. i) says:

> *Research in the information systems field examines more than just the technological system, or just the social system, or even the two side by side: in addition, it investigates the phenomena that emerge when the two interact.*

The Association for Information Systems and other bodies develop curriculum guidelines to provide guidance to educators in teaching the subject matter in information systems courses worldwide and, thus, equip graduates with the skills they need to engage in professional practice. As an example, Topi et al. (2010, p. vii) lists the high-level information systems capabilities that information systems undergraduates should have as follows:

> *Improving organizational processes, exploiting opportunities created by technology innovations, understanding and addressing information requirements, designing and managing enterprise architecture, identifying and evaluating solution and sourcing alternatives, securing data and infrastructure, and understanding, managing and controlling IT risks.*

This specification shows that information systems does not concern humans alone and that it incorporates knowledge of technology as, for example, in enterprise architecture and methods for developing systems. Similar to other disciplines such as medicine, architecture, and engineering, information systems studies artifacts (technology) and how they are constructed and deals with how humans interact with these artifacts.

3 What is "Science"?

McBride (2018) does not address in depth the question of what defines science and does not explicitly acknowledge the many views of what science means. He appears to characterize science as being tied to the use of quantitative methods, determinism, replication of results, and universal laws. He claims there is an "underlying deterministic philosophy of information systems" that results "in a type of research that favors numbers over words and concepts, which reifies the scientific hypothesis and expects reproducible cause and effect" (p. 165). This sweeping statement demonstrably does not characterize information systems. For example, Olbrich, Frank, Gregor, Niederman, and Rowe (2017) have questioned Dennis and Valacich's (2014) views on replication research. Siponen and Tsohou (Forthcoming) point out problems with portraying positivism in information systems and its confounding with some views of science.

McBride (2018) claims that research in information systems overly relies on quantitative methods and experiments. This observation may be accurate. Several people have questioned the prevalence of TAM studies, and the fact that TAM rests mainly on one type of research method (namely, cross-sectional surveys) poses a problem for philosophers of science who look for various types of evidence to support theory (see Hempel, 1966). Problems here may more concern journal practices and the history of the discipline than reflect something about the methods themselves. The fact that researchers may have inappropriately used experimental methods and quantitative methods in some cases does not imply that researchers should never use these methods.

We can find more nuanced views of science in the philosophy of science itself. Hempel (1966) talks more about the "credibility" of claims that scientists make rather than an expectation that laws hold universally and that findings must be reproducible. For Hempel, researchers look for "more or less strong support" and for factors that "increase or decrease the credibility of a hypothesis" (p. 33). Further, "the confirmation of a hypothesis does not depend only on the quantity of the favorable evidence available, but also on its variety: the greater the variety, the stronger the resulting support" (p. 34). Variety can come from evidence obtained through observation and careful reasoning and not just experimentation and measurement. Hannson (2017, p. 6) acknowledges the difficulties in trying to define science but states:

> *The natural and social sciences and the humanities are all parts of the same human endeavor, namely systematic and critical investigations aimed at acquiring the best possible understanding of the workings of nature, people and human society.*

McBride (2018) does not acknowledge views on differing categories for science and, thus, does not fully consider what category the IS discipline would best suit. Simon (1996) proposed that disciplines such as information systems that deal with human-created artifacts, including medicine, architecture, management, economics and engineering, should belong to the "sciences of the artificial". Gregor (2009) shows how the recognition of different forms of science emerged in Western culture historically with the natural sciences in the 17th to 18th centuries, the human sciences in the 19th century, and the sciences of the artificial in the 20th century. Denning and Martell (2015) distinguish the great domains of science as being physical, life, social and computing. Denning and Martell see information systems as one of the "computing" domains and argue that the computing sciences constitute the only science with "such a strong emphasis on information causing action" (p. 16). That is, one can encode information concerning human plans and designs in software systems that then act independently.

By considering information systems as one of the sciences of the artificial, we can carefully consider the special characteristics of a science that deals with both humans and technology and how to best develop knowledge in such a discipline, a discipline that deals with knowledge of prescriptive (know-how) knowledge and descriptive (know-what) knowledge.

4 Pseudoscience, Non-Science, and Ethical Considerations

Even when defining science in a broader way, one needs to distinguish scientific endeavors from pseudo-science and non-science. Hannson (2017) points out that medical science evaluates and develops treatments according to evidence on their efficacy. Pseudoscience can give rise to ineffective and possibly dangerous interventions. Patients especially want reassurance that drugs have been carefully tested, and experiments with randomized control trials are commonly regarded as the highest level of evidence. Development of drugs and their release requires strict supervision and ethical protocols.

Information systems has similarities with medical science in that it deals with humans and technology and complex situations. Despite McBride's (2018) claims, experimentation is important in information systems. For example, systems development uses informal experimentation. Controlled experiments can give important information about what works and what does not. For example, in human-computer interaction, experiments could show a preferable layout for a screen in a safety-critical system and, thus, minimize accidents (see Shneiderman et al., 2016). The information systems body of knowledge and computing more generally also contain general principles to guide action. For example, Denning and Martell give design principles with a high degree of generality, such as "align the design with practices familiar to users" (p. 200) and "considerable testing of the system as a whole is needed…when the independently designed modules are plugged together" (p. 209).

System developers and managers who ignore these principles do not act professionally and, at times, possibly even unethically. Failure to follow such guidelines can result in under-performing systems or system failure with serious consequences for individuals, organizations, and society. Avison, Gregor, and Wilson (2006) give examples, including one at Royal Melbourne Institute of Technology where a failure to observe the system-testing principle I provide above had serious consequences for students and the university.

Unfortunately, such failures continue and will likely become more significant with the increase in power and reach of contemporary information systems.

What happens if we consider information systems as a field in the humanities akin to dance studies? Hannson (2017) says researchers do not commonly use the word science for areas of the humanities such as history and literature. He would probably not use it for dance studies either. Is this matter just one of terminology? If the IS discipline discards the word science, then it may also discard its focus on critically evaluating knowledge claims via methods including experiments—in my opinion, an unacceptable risk. I would prefer that people who act in accordance with a body of knowledge that has been developed systematically and concurs with current available evidence develop and thoroughly test information systems that can have a tremendous impact on human beings.

Information systems and dance studies differ considerably in the degree to which they involve the potential to benefit or harm human beings. A poor dance performance could lead to people experiencing discomfort. A poorly designed hospital system could lead to people dying. In my view, one can scarcely compare the two, and the proposal that dance studies represents a suitable model for information systems poses extreme danger. Thus, one should regard information systems as a science and, more specifically, as one of the sciences of the artificial.

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About the Author

Shirley Gregor is a Professor of Information Systems at the Australian National University. Her research interests include intelligent systems, human-computer interaction, the innovative and strategic use of information and communications technologies, and the philosophy of science and technology. Shehas led several large applied research projects funded by bodies including the Australian Research Council and AusAID. She has published in outlets such as *MIS Quarterly, Journal of Management Information Systems, Journal of the Association of Information Systems,* and the *European Journal of Information Systems*. She was a Senior Editor for *MIS Quarterly* 2008-2010 and was Editor-in-Chief for the *Journal of the Association of Information Systems* from 2010 to 2013. Sge was made an Officer of the Order of Australia in June, 2005. She is a Fellow of the Australian Computer Society and the Association for Information Systems. In 2014, she was awarded a Schöller Senior Fellowship at the Friedrich Alexander University of Erlangen-Nurenberg.