Higher Education **40:** 277–292, 2000.
© 2000 *Kluwer Academic Publishers. Printed in the Netherlands.*

Performance indicators as conceptual technologies

BOB BARNETSON[1,*] & MARC CUTRIGHT[2]
[1]*Alberta Colleges & Institutes Faculties Association, #412 10357, 109th Street, Edmonton, Alberta, Canada, T5J 1N3;* [2]*The Johns Hopkins University*
([*]author for correspondence; E-mail: barnetsonb@acifa.gmcc.ab.ca)

Abstract. This paper posits that performance indicators (PIs) are conceptual technologies that shape what issues academics think about and how academics think about those issues by embedding normative assumptions into the selection and structure of those indicators. Exploring the assumptions embedded in Alberta's (Canada) PIs yields an initial typology of assumptions that academics can apply to performance indicators in higher education to understand, refine or critically challenge their introduction.

Keywords: Canada, conceptual technology, critical theory, higher education, institutional effectiveness, performance indicators, performance funding, resource allocation

Introduction

The literature on applying performance indicators (PIs) to higher education is voluminous and focuses on description and prescription (cf. Burke and Serban 1999a; Cave et al. 1997; Ruppert 1994; Gaither 1995; Gaither et al. 1994; Borden and Banta 1994). There is substantially less written about PIs from explanatory perspective with authors either ignoring how PIs affect organizational behaviour or implicitly assuming that organizations are rational (i.e., operate like machines) and PIs mediate between outcomes and goal setting (Boberg and Barnetson 2000). There is also little written on PIs from a critical perspective (cf. Schmidtlein 1999; Polster and Newson 1998; Peters et al. 1993; Peters 1992) reflecting a tendency in the higher education literature to focus on issues of effectiveness and efficiency rather than social justice and democracy (Ingram 1991; Lincoln 1991; Slaughter 1990).

This study posits that performance indicators in higher education are conceptual technologies that shape *what* issues we think about and *how* we think about those issues by embedding normative assumptions into the selection and structure of those indicators. A six-category typology of embedded assumptions emerges from an examination of the assumptions embedded in Alberta's PIs. This paper adds to the explanatory literature by positing an alternative way in which to view the impact of PIs on organizations. This

paper also adds to the critical literature by providing an analytical technique that academics can use to understand, refine or critically challenge the implementation of PIs. Underlying this approach is the belief that PIs are conceptual technologies – shaping *what* issues we think about and *how* we think about those issues – that contain normative assumptions embedded during their selection and construction.

Literature review

The use of PIs and performance funding is outlined below. This leads to discussion of PIs and performance funding as policy instruments and the notion that PIs act as conceptual technologies.

Performance indicators

Cave et al. (1997) classify indicators as simple (neutral descriptions), general (data unrelated to goals) and performance (possessing a point of reference or goal against which a performance is compared). For example, overall institutional enrollment is a *simple indicator* because it provides a neutral description. Students' perceptions of how enrollment affects the feeling of community would be a *general indicator* because the indicator's evaluation is unrelated to institutional goals. If an institution is mandated to increase its enrollment by $\geq$ 4% each year, the percentage change in enrollment would be a *performance indicator* because it contains a point of reference or goal against which a performance can be compared. As measures of institutional performance, PIs tend to be numeric and seek to operationalize concepts such as quality by specifying how they will be quantified (Dochy et al. 1990). For example, if a government seeks to increase the accessibility of post-secondary education and implements a PI that measures and rewards increases in student spaces, the government operationalizes accessibility in a way that focuses on the number of seats available and excludes an examination of affordability.

Kaufman (1988) identifies five organizational elements to which PIs can be applied:

1. *Inputs* are raw materials (e.g., resources, policies, communal characteristics).
2. *Processes* are how inputs become products, outputs and outcomes (e.g., teaching).
3. *Products* are results that are fed back into the system to become outputs and outcomes (e.g., courses completed that eventually lead to an output such as degrees awarded).

4. *Outputs* are aggregate products of a system (e.g., degrees awarded, papers published).
5. *Outcomes* are the effects of outputs in society (e.g., employment rates, life expectancy, democracy).

Figure 1 presents an outcome-based PI measuring graduates' employment rates. All graduates are surveyed to determine the percentage employed.

Employment rate: Percentage of graduate-survey respondents employed within a specified time period following program completion.

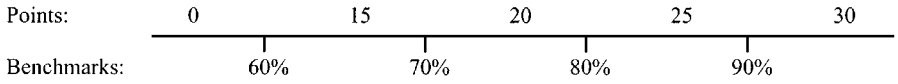

Figure 1. Graduate employment rate

This indicator is a performance indicator because it contains a goal or point of reference (i.e., 100% employment) against which performance is judged.

Performance funding

Performance funding is widely used in the United States (Burke and Serban 1999b) and entails allocating resources based upon a performance rather than in anticipation of one (Layzell and Caruthers 1995). Proponents argue that allocating a small portion of institutions' funding based upon performance can propel institutions to address government priorities without introducing damaging instability in funding (Bateman and Elliott 1994). This effect can be explained by *resource dependence theory*: organizations are dependent upon their environment for resources and organizational behaviour is a response to the actions of external agents who control these resources; changes in resource availability destabilize organizations and result in adaptation to ensure survival (Pfeffer and Salancik 1978; Pfeffer 1992).

In this way, PIs and performance funding are *policy instruments* (i.e., tools that propel institutions and/or individuals to act when otherwise they could not or would not). Schneider and Ingram (1990) note seven reasons why policy goals are not automatically implemented, including a lack of: authority, direction, incentives, capacity, agreement with policy, understanding of policy, or comprehension that a directive has been issued. The literature outlines four types of policy instruments (McDonnell 1994; Pal 1992; Schneider and Ingram 1990; McDonnell and Elmore 1987):

1. *Authority-based* instruments grant permission, prohibit or require action and may include changing the distribution of authority and power in the system.
2. *Incentive-based* instruments use inducements, sanctions, charges or force to encourage action.
3. *Capacity-building* instruments invest in intellectual, material or human resources to enable activity.
4. *Hortatory* instruments signal priorities and propel action by appealing to values via symbols.

Performance funding and PIs are policy tools in that they are designed to advance an agenda. Performance funding combines hortatory and incentive-based approaches to implementing policy.

Performance indicators as conceptual technologies

The central premise of this study is that PIs have normative assumptions embedded in them. These embedded assumptions make PIs *conceptual technologies*; that is, PIs shape *what* issues we think about and *how* we think about those issues through the selection and structure of the indicators that are used. This idea is derived from Polster and Newson's (1998) assertion that PIs manage and control academic work by making visible and subjecting academic activities to external evaluation.

> PIs open up the routine evaluation of academic activities to other than academic considerations, and they make it possible to replace substantive judgments with formulaic and algorythmic representations. For example, judgments of teaching quality can be replaced by mechanically produced, standardized "facts" such as class size. These can then be compared across departments, faculties and even universities in association with other facts – for example, student output – to assess the cost effectiveness of a given institution's deployment of its teaching resources (Polster and Newson 1998, p. 175).

Performance indicators can be used to shape *what* issues we think about by focusing our attention on specific aspects of institutional performance. For example, a PI that measures graduates' employment rates indicates to institutions that this outcome is of importance to the agency that mandated its introduction; the act of measurement makes institutional performance on this PI public. By focusing institutional attention on their PI performance, governments may impose a policy agenda on institutions by embedding assumptions related to purposes, goals or values into the selection and structure of indicators. In this way, PIs shift the power to set priorities and goals to those

who create and control these documentary decision-making systems (Newson 1994) thereby reconstructing the relationship between academics and those who construct and operate PIs systems.

Performance indicators can also be used to shape *how* we think about an issue. For example, the inclusion of PIs that demonstrate the positive outcomes of a policy agenda and the exclusion of PIs that demonstrate negative outcomes generates evidence that legitimate a particular policy agenda. Consequently, the use of PIs affects how institutions and policies are evaluated because the power to delineate what evidence is considered relevant is shifted to those who create and control PI-driven systems.

The use of PIs, however, not only shifts decision making power upwards and outwards, it also facilitates the use of financial rewards and punishments to manipulate institutional behaviour. Slaughter and Leslie (1997) suggest that fiscal retrenchment means even small amounts of funding exert substantial influence upon institutional behaviours. This creates the potential for substantial erosion of institutional autonomy and academic freedom if the evaluative information generated by PIs is linked to funding. By making visible the assumptions embedded in a series of PIs, it becomes possible for academics to understand, refine or critically challenge their implementation. Devising a typology of embedded assumptions makes it easier to see these assumptions.

Methodology

The purpose of this study was to develop an initial typology of assumptions commonly embedded in PIs. The performance funding system in Alberta was selected for study because of the authors' access to information about it and because this system is based upon PIs commonly used elsewhere (Cave et al. 1997). As reported below, five (of nine) indicators were selected and the assumptions underlying the use of each indicator were detailed. Subsequently, the assumptions underlying each of the five PIs were explicated and common assumptions were grouped together. This lead to the six-category typology of assumptions that is reported below. Because of its utility in organizing the assumptions underlying each PI, this typology is used in reporting the assumptions underlying each of the PIs.

Results

The results of this initial exploration of the assumptions underlying PIs is reported below. A brief description of Alberta's higher education system and

Employment rate: Percentage of graduate-survey respondents employed within a specified period following program completion.

Points:	0	15	20	25	30
Benchmarks:		60%	70%	80%	90%

Graduate satisfaction with overall quality: Percentage of graduate-survey respondents fully/somewhat satisfied with overall educational quality.

Points:	0	15	20	25	30
Benchmarks:		70%	80%	90%	95%

Credit FLE: Percentage change in full-load equivalent enrollment from one period to the next.

Points:		0	20	25	30
Benchmarks:	Urban	-2%	0%	+4%	
	Rural	-5%	0%	+4%	

Administrative expenditures: Administration as a percentage of total expenditures less ancillary expenditures.

Points:		0	3	4	5
Benchmarks:	> 3500 students	11%	7%	5%	
	≤ 3500 students	12%	8%	6%	

Enterprise revenue: Revenues less all government grants, tuition fees under policy, sponsored research (universities only), ancillary services and earned capital contributions as a percentage of government grants.

Points:		1	3	4	5
Benchmarks:	Urban	20%	35%	50%	
	Rural	10%	25%	40%	

Figure 2. Alberta's learning component indicators (AECD 1997).

the development is its PIs and performance funding system is provided for context. Subsequently, each of the five indicators examined is outlined as are the assumptions found embedded in each indicator.

Alberta's higher education system

One of Canada's 10 provinces and three territories, Alberta has a population of 2.8 million and a public post-secondary system enrolling approximately 123,000 students in four universities, two technical institutes, 15 two-year colleges, five religiously affiliated, degree-granting, not-for-profit university-colleges and the Banff Centre for professional development (AECD 1998). Government transfers to institutions totalled $891 million in 1998 (AECD 1999). As part of the 1994 restructuring of resource allocation, Alberta developed a performance indicator-driven funding mechanism to allocate $15 million annually (rising to $23 million in 2000). Performance awards are based upon nine PIs (AECD 1997). Five PIs are used by all institutions (the learning component) while four PIs affect only research universities (the research component).

This analysis focuses on the learning component indicators. An institution's performance on each PI (e.g., graduates' employment rates) is assessed and plotted on a linear scale (e.g., 0 to 100%). Benchmarks divide the linear scale into a series of performance corridors (e.g., 60–69%, 70–79%, 80–89%, $>$ 89%); all institutions within a corridor are assigned the same number of points (see Figure 2). Each institution's point total is used to allocate funding (AECD 1996). Research universities also incorporate points from the research component PIs.

The learning component's five indicators fall into three categories based upon the government's goals of increasing responsiveness, accessibility and affordability (AECD 1994, 1997). Institutional *responsiveness* to the needs of learners and to provincial social, economic and cultural needs is assessed by examining the employment rates of graduates and graduates' satisfaction with their educational experience. Institutional progress towards higher levels of *accessibility* (i.e., increasing the number of students enrolled) is indicated by examining changes in full-load equivalent (FLE) enrollment based on a three-year rolling average. Institutions' success at maintaining *affordability* (i.e., providing quality learning opportunities to the greatest number of Albertans at a reasonable cost to the learner and taxpayer) is indicated by examining administrative expenditures and outside revenue generated.

Table 1. Assumptions embedded in Alberta's PIs

Indicator	*Assumption type*	*Specific assumption*
Employment rate	Value	High levels of graduate employment are desirable.
	Definition	Responsiveness entails matching programing to labor market needs.
	Goal	Institutions should increase graduates' employment rates.
	Causality	Institutions can (1) control program offerings and (2) match program offerings with labour market demands.
	Comparability	Institutions are equally able to generate labour market outcomes.
	Normalcy	All institutions' graduates' have comparable career trajectories.
Satisfaction rate	Value	High levels of graduate satisfaction are desirable.
	Definition	Responsive entails providing programs that satisfy graduates.
	Goal	Institutions should increase the satisfaction rate of their graduates.
	Causality	Institutions can control the factors that contribute to graduates' satisfaction.
	Comparability	Institutions are equally capable of satisfying their learners.
	Normalcy	An institution's graduates have compatible program expectations.
Credit FLE enrollment	Value	Enrollment growth is desirable.
	Definition	Accessibility is a function of student spaces (measured by enrollment).
	Goal	Institutions should increase their enrollment.
	Causality	Institutions can influence (1) the demand for spaces and (2) the availability of spaces.
	Comparability	Institutions are equally able to increase enrollment.
	Normalcy	Economies of scale are equal between institutions.
Administrative expenditures	Value	Low levels of administrative expenditures are desirable.
	Definition	Affordable entails minimizing administrative expenditures.
	Goal	Institutions should decrease administrative expenditures.
	Causality	Institutions can control the factors that contribute to administrative expenditures.
	Comparability	Institutions face similar economies (and diseconomies) of scale.
	Normalcy	Enrollment increases reduce per-student administrative costs.
Enterprise revenue	Value	High levels of non-government/non-tuition revenue is desirable.
	Definition	Affordability entails maximizing external revenue generation.
	Goal	Institutions should increase external revenue generation.
	Causality	Institutions can generate external revenue.
	Comparability	Institutions have similar abilities to generate external revenue.
	Normalcy	Raising revenue is compatible with institutions' teaching function.

Assumptions embedded in Alberta's PIs

A number of embedded assumptions emerged from analysis of Alberta's PIs (see Table 1). This table presents the type of assumptions embedded in the PI and the specific assumptions made by the PI. This presentation is slightly misleading in that the specific assumptions were determined first and led to the six-category typology of assumptions that is used below to organize the reporting.

Two themes emerge from examining Alberta's PIs. First, higher education is being framed as a source of labour market training. Of the 100 points available to institutions in the learning component, 30 points are allocated based upon the employment rates of graduates. A further 30 points are allocated based upon graduates' satisfaction. The pressure placed upon students by rising tuition and debt levels (AECD 1999) to secure employment and the prominence of employment outcomes as a motive for enrolling in higher education (Barnetson 1997) suggests the graduate satisfaction may be a function of their employment outcomes. If so, both of these PIs tap into the vocational outcomes of higher education. As measures of how well institutions are meeting the needs of learners as well as the province's economic, cultural and social needs, the PIs used narrow the performance of interest to vocational (i.e., economic) outcomes (Cutright and Griffith 1997).

Second, the learning (and the not shown research) component PIs reward institutions for developing non-governmental revenue streams. In addition to indicators that reward institutions for external funding, the Credit FLE indicator rewards institutions for increasing enrollment. The maximum award (of 2.26% of operating grants) requires a 4% increase in enrollment – the shortfall requiring either efficiency gains, increases in tuition or increases in external revenue generation. The overall effect of these indicators is to reapportion the responsibility for funding higher education – increasing the reliance on tuition and external revenue while decreasing reliance on government grants.

These two themes are present in government policy statements (Barnetson and Boberg 2000) and this suggests that Alberta's PI system is a policy instrument designed to propel institutions to accomplish government goals. This instrument works by creating data available for public scrutiny (i.e., as a hortatory instrument) and financially rewarding institutions for generating these outcomes (i.e., as an incentive-based instrument).

Typology of assumptions embedded in performance indicators

Analysis of Alberta's PIs suggest the following six-category typology of assumptions embedded in PIs. Table 2 presents the six types of normative

Table 2. Typology of embedded assumptions

Type	*Explanation*
Value:	The act of measurement delineates what activity or outcome is valued. That is, the inclusion or exclusion of PIs determines what is considered important and unimportant.
Definition:	Performance indicators (re)define concepts (e.g., accessibility, affordability, quality, etc.) by operationalizing them in measurable terms.
Goal:	Performance indicators differ from simple indicators because they include a point of reference by which a performance is judged. Performance indicators assign goals through both the value embedded in an indicator and the point of reference used in the indicator.
Causality:	Performance indicators assign responsibility for an activity or outcome by embedding an assumption of causality. This may confuse causality (i.e., one variable causing a second) with association (i.e., where two variables occur together as a result of a third variable) and assert that institutional activities play a determinant role in generating the performance assessed.
Comparability:	The use of common PIs assumes institutions (departments, individuals etc.) are comparable. This may pressure institutions to generate common outcomes or undertake common activities which may or may not be appropriate given institutional circumstances and mission.
Normalcy:	Performance indicators delineate a range of normal behaviors or outcomes. This may pressure institutions to alter their activities so as to decrease a systemic disadvantage or increase a systemic advantage.

assumptions that can be embedded into PIs as suggested by a review of Alberta's performance funding system.

By making explicit the assumptions embedded in a series of PIs, it becomes possible to understand the broader policy agenda that underlies the PIs and, subsequently, to knowledgably approve of, alter or critically challenge their implementation. Table 3 presents a series of questions designed to bring out the assumptions embedded within each PI.

Applying these questions to PIs provides insight into the assumptions made during the construction of PIs. It is also important to examine the overall impact of a system of PIs. Table 4 presents a series of questions designed to bring out the assumptions embedded within a PI system.

Once an initial assessment of the assumptions embedded in a PI or system of PIs is complete, some general trends may be evident. At this point, it may be enlightening to compare the conclusions to the stated goals of a system. This comparative process may find similarities between stated goals and the trends evident in the PIs used within the system. Comparing stated goals

Table 3. Determining assumptions embedded in PIs

Value	By its inclusion, what does this PI indicate is important to those who constructed and/or operate this PI?
Definition	How does this PI define a concept by operationalizing it in measurable terms? For example, if accessibility is determined by measuring the increase in student spaces available, accessibility is defined as the existence of student spaces.
	What alternative definition(s) of this concept exist? For example, examining students' ability to afford tuition costs defines accessibility as the affordability of post-secondary education to students.
Goals	What outcome does this PI expect from an institution (department, individual, etc.) based upon the value and the point of reference embedded within it?
Causality	Who does this PI make responsible for a performance?
	What assumption of causality underlies this assignment of responsibility? For example, making institutions responsible for graduates' satisfaction assumes that institutions can control and deterministically influence the factors contributing to satisfaction.
Comparability	In what ways does this PI assume institutions are comparable? For example, measuring external revenue generation by colleges, universities and technical institutes implies that rough parity in the ability of each type of institution to generate external revenue.
Normalcy	What assumptions does this PI make about "normal" behaviours or outcomes? For example, measuring graduates' employment rates in fields related to their area of study at a fixed point after graduation assumes that it is desireable and possible for all graduates to find work within their disciplines and that graduates of all disciplines have roughly similar career trajectories.

and the structures designed to bring them about may also illuminate unstated goals, how those goals are operationalized and attempts within the system to mitigate or alter goals at the operational level.

Discussion

It is generally accepted that performance indicators make knowledge objective – that is, independent of its creators and users through quantification (Porter 1995). Quantified knowledge is independent because it is less dependent than narrative-derived knowledge upon context for interpretation and, therefore, is more easily transported across time and distance with minimal loss of content. Quantification also facilitates comparison between

Table 4. Determining assumptions embedded in systems of PIs

Value	By their inclusion, what do this system's PIs indicate is important to those who constructed and/or operate this system?
	What do the PIs excluded in this system indicate is of lesser or no importance to those who constructed and/or operate this system?
Definition	Are there definitional trends evident within the system? For example, do the PIs in a system operationalize performances in economic terms?
Goals	Are there trends in the goals assigned by this system? For example, do the PIs consistently reward institutions that decrease costs to government by increasing efficiency and broadening the funding base?
Causality	Is responsibility consistently attributed to one group? For example, a system of PIs may consistently assign responsibility for outcomes to institutions or it may disperse responsibility among several groups (e.g., government, students, institutions, exogenous environmental factors, etc.).
	Are there trends in the assumptions of causality that underlie the assignment of responsibility? For example, a system of PIs may assumes that institutions can control and deterministically influence the factors contributing to several PIs.
Comparability	How does the PI system deal with comparisons between institutions? For example, a system of PIs may consistently (or inconsistently) recognize or ignore differences between institution's goals, missions, circumstances and resources.
Normalcy	What activities and/or outcomes does this system assume to be normal?

or generalizations about institutions or systems by suppressing contextual factors that can complicate comparison and generalization (Power 1994). Finally, Porter (1995) posits that quantification constrains the ability of others to exercise judgment when they use the information thereby subordinating personal bias to public standards. Such mechanical objectivity (i.e., following a set of rules to eliminate bias) is similar to the political and moral use of objectivity to mean impartiality and fairness. This differs from absolute objectivity (i.e., knowing objects as they really are) and disciplinary objectivity (i.e., reaching consensus with one's peers about the nature of objects).

In this way, the use of PIs and performance funding in governance is designed to increase objectivity by applying a commonly agreed upon sets of rules to achieve a series of ends. For example, proponents argue that accountability (i.e., providing a report of one's performance and being responsible for it) can be increased through the application of a standardized set of

system-wide PIs (Wagner 1989; Ewell 1987). Similarly, organizational goal attainment can be improved via regulation (i.e., assessing a performance and acting to change or maintain it) based upon PIs (Kells 1992). In theory, then, the application of these measures should increase the impartiality of governance as decisions can be made based upon facts rather than other considerations (Power 1996). The belief that increasing objectivity (through quantification of outcomes) and linking resource allocation to outcomes will increase organizational effectiveness is consistent with the mechanical model of organizational functioning.

This article contests the objectivity of PIs by asserting that normative assumptions are embedded in PIs and shape *what* issues we think about and *how* we think about those issues. This suggests that PIs are not a mere technical means of evaluating performance and/or allocating funding, but rather are a policy instrument designed to generate a particular set of outcomes. As a policy instrument, PIs have the potential to significantly reduce institutional autonomy (i.e., the freedom to make substantive decisions about institutional direction). This view differs from the usual assertion that the use of PIs results in much needed institutional accountability. *Accountability* is that which is exchanged for autonomy in an authority relationship (McDonnell 1994; Neave 1980). Being *accountable* entails providing a report of one's performance and being responsible for that performance (Wagner 1989; Ewell 1987). Using PIs to shape institutional behavior (particularly when PIs guide resource allocation) confuses accountability with regulation (Kells 1992). *Regulation* involves an outsider examining a performance and acting to maintain or change it (possibly through rewards and/or punishments). Regulation erodes autonomy rather than acting as a *quid pro quo* for it. Despite the negative impact that the introduction of PIs can have on institutional autonomy, few academic leaders resist their implementation. In part this may stem from recognition of the overwhelming support enjoyed by policy instruments that act in market-like ways and the easy target made by those who resist the idea that performance indicators represent a simple solution to issues of resource allocation and accountability.

An obvious limitation of this preliminary study is its limited scope. Much further work needs to be done to determine the generalizability of the typology presented above and perhaps to refine it. As part of this work, it would be interesting to explore whether PIs contribute to restructuring the relationship between academics and institutions and the relationship between institutions and governments. Do PIs provide a means by which to shift decision making power *upwards* to administrators and *outwards* towards government, students and corporations? Polster and Newson (1998) assert that PIs manage and control academic work by making visible and subjecting academic activities

to external evaluation as well as linking the resultant judgments to budgetary consequences. It would appear that the use of PIs certainly make possible these outcomes. But whether or not this is actually occurring and what factors might lead to (or impede) this outcome remains unknown.

One of the interesting outcomes of viewing PIs as conceptual technologies is that it brings into question the models and metaphors we use to think about organizations (not to mention the nature of the world). There is little discussion in the literature about how PIs actually operate (i.e., how they actually affect institutional behaviour) and what discussion there is tends to be premised upon the notion that institutions operate in rational ways – that is, organizations can be thought of as machines with discrete actions and clear cause and effect (Barnetson, forthcoming, a). Alternatives to this view of organizations abound (e.g., Cohen, March and Olsen 1972; March and Olsen 1976) but the recent application of chaos theory-derived planning metaphors to higher education (Cutright 1999) provides a viable alternative way to conceptualize organizational functioning. Thinking of PIs as conceptual technologies that affect what issues institutions focus on seems consistent (at least initially) with the notion that organizations are unstable and bounded by a series of attractors, to use a term from chaos theory (Barnetson, forthcoming, b). Perhaps PIs affect institutions by increasing or decreasing the power of these attractors.

References

AECD (1994). *New Directions for Adult Learning in Alberta*. White Paper. October. Edmonton: Advanced Education and Career Development.

AECD (1996). *Encouraging Excellence and Rewarding Success in Alberta's Public Adult Learning System: A Proposal for Implementing a Performance Funding Envelope*. December. Edmonton: Advanced Education and Career Development.

AECD (1997). *Rewarding Progress Towards Goals: Highlights of Alberta's Performance Envelope Funding*. July 31. Edmonton: Advanced Education and Career Development.

AECD (1998). *1997/98 Annual Report*. Edmonton: Advanced Education and Career Development.

AECD (1999). *1998/99 Annual Report*. Edmonton: Advanced Education and Career Development.

Barnetson, R.J. (1997). *Marketing The University of Calgary to Frosh*. Unpublished Master's Thesis. University of Calgary, Faculty of Education.

Barnetson, B. (forthcoming, a). 'The metaphors and beliefs legitimating performance funding'. *Quality in Higher Education*.

Barnetson, B. (forthcoming, b). 'Performance indicators, chaos theory, and planning', in Cutright, M. (ed.), *Chaos Theory and Higher Education: Leadership, Planning, and Policy*. Baltimore: Peter Lang.

Barnetson, B. and Boberg, A. (2000). 'Resource allocation and public policy in Alberta's post-secondary system', *Canadian Journal of Higher Education*. In press.

Bateman, M. and Elliott, R.W. (1994). 'An attempt to implement performance-based funding in Texas higher education: A case study', in Epper, R.M. (ed.), *Focus on the Budget: Rethinking Current Practice, State Policy and College Learning*. Denver: Education Commission of the States. 41–52. ERIC Document Reproduction Service. ED 375 790.

Boberg A. and Barnetson, B. (2000). 'System-wide program assessment with performance indicators: Alberta's performance-funding mechanism', *Canadian Journal of Program Assessment* (Winter), 1–26.

Borden, V.H.M. and Banta, T.W. (eds) (1994). 'Using performance indicators to guide strategic planning', in *New Directions for Institutional Research* 82. San Francisco: Jossey-Bass.

Burke, J.C. and Serban, A.M. (eds) (1999a). 'Performance funding for higher education: Fad or trend?', in *New Directions for Institutional Research* 97. San Francisco: Jossey-Bass.

Burke, J.C. and Serban, A.M. (1999b). 'State synopses of performance funding programs', in Burke J.C. and Serban. A.M. (eds), *Performance Funding for Public Higher Education: Fad or Trend? New Directions for Institutional Research* 97, 25–48.

Cave, M., Hanney, S., Henkel, M. and Kogan, M. (1997). *The Use of Performance Indicators in Higher Education: The Challenges of the Quality Movement*, 3rd ed. London: Jessica Kingsely.

Cohen, M.D., March, J.G. and Olsen, J.P. (1972). 'A garbage-can model of organizational choice', *Administrative Science Quarterly* 17, 1–25.

Cutright, M. (1999). 'Planning in higher education: A model from chaos theory'. *Paper presented at the annual conference of the American Educational Research Association*. Montreal. April.

Cutright, M. and Griffith, B. (1997). 'Higher education in the service of the economy: Education ministry reconfigurations and the corporatist agenda'. *Paper presented at the annual conference of the Parkland Institute*. Edmonton.

Dochy, F.J.R.C., Segers, M.S.P. and Wijnen, W.H.F.W. (1990). *Management Information and Performance Indicators in Higher Education: An International Issue*. The Netherlands: Van Gorcum.

Ewell, P.T. (1987). *Assessment, Accountability and Improvement: Managing the Contradictions*. American Association for Higher Education Assessment Forum. ERIC Document Reproduction Service. ED 287 330.

Gaither, G.H. (ed.) (1995). 'Assessing performance in an age of accountability: Case studies', in *New Directions for Higher Education* 91. San Francisco: Jossey-Bass.

Gaither, G.H., Nedwek, B.P. and Neal, J.E. (1994). *Measuring Up: The Promise and Pitfalls of Performance Indicators in Higher Education*. ASHE-ERIC Higher Education Report. No. 5. ERIC Document Reproduction Service. ED 383 279.

Ingram, D. (1991). *Critical Theory and Philosophy*. New York: Garland.

Kaufman, R. (1988). 'Preparing useful performance indicators', *Training and Development Journal* (September), 80–83.

Kells, H. (1992). *Self-regulation in Higher Education: A Multinational Perspective on Collaborative Systems of Quality Assurance and Control*. London: Jessica-Kingsley.

Layzell, D.T. and Caruthers, J.K. (1995). 'Performance funding at the state level: Trends and prospects'. *Paper presented at the Annual meeting of ASHE*. Orlando. ERIC Document Reproduction Service. ED 391 406.

Lincoln, Y.S. (1991). 'Advancing a critical agenda', in Tierney, W.G. (ed.), *Culture and Ideology in Higher Education: Advancing a Critical Agenda.* New York: Prager, pp. 17–32.

March, J.G. and Olsen, J.P. (eds) (1976). *Ambiguity and Choice in Organizations*. Oslo: Universiteforlaget.

McDonnell, L.M. (1994). 'Assessment policy as persuasion and regulation', *American Journal of Education* 102, 394–420.

McDonnell, L.M. and Elmore, R.F. (1987). *Alternative Policy Instruments*. Santa Monica: The RAND Corporation.

Neave, G. (1980). 'Accountability and control', *European Journal of Education* 15(1), 49–61.

Newson, J.A. (1994). 'Subordinating democracy: The effects of fiscal retrenchment and university-business partnerships on knowledge creation and knowledge dissemination in universities', *Higher Education* 27, 141–161.

Pal, L. (1992). *Public Policy Analysis*, 2nd ed. Toronto: Nelson.

Peters, M. (1992). 'Performance indicators in New Zealand higher education: Education or control?', *Journal of Educational Policy* 7(3), 267–283.

Peters, M.C., Freeman-Moir, J. and Peters, M.A. (1993). 'Competition in tertiary education'. Unpublished paper. University of Canterbury, Education Department.

Pfeffer, J. (1992). *Managing with Power: Politics and Influence in Organizations*. Boston: Harvard Business School Press.

Pfeffer, J. and Salancik, G.R. (1978). *The External Control of Organizations: A Resource Dependence Perspective*. New York: Harper and Row.

Polster, C. and Newson, J. (1998). 'Don't count your blessings: The social accomplishments of performance indicators', in Currie, J. and Newson, J. (eds), *Universities and Globalization: Critical Perspectives*. Thousand Oaks: Sage, pp. 173–182.

Porter, T.M. (1995). *Trust in Numbers: The Pursuit of Objectivity in Sciences and Public Life*. Princeton: Princeton University Press.

Power, M. (1994). 'The audit society', in Hopwood, A.G. and Miller, P. (eds), *Accounting as Social and Institutional Practice*. London: Cambridge University Press, pp. 299–316.

Power, M. (1996). 'Making things auditable', *Accounting, Organizations and Society* 21(2/3), 289–315.

Ruppert, S.S. (ed.) (1994). *Charting Higher Education Accountability: A Sourcebook on State-level Performance Indicators.* Denver: Education Commission of the States.

Schmidtlein, F.A. (1999). 'Assumptions underlying performance-based budgeting'. *Paper presented at the 39th annual AIR Forum*. Seattle.

Schneider, A. and Ingram, H. (1990). 'Behavioral assumptions of policy tools', *Journal of Politics* 52(2), 510–529.

Slaughter, S. (1990). *The Higher Learning and High Technology: Dynamics of Higher Education Policy Formation*. Albany: SUNY Press.

Slaughter, S. and Leslie, L.L. (1997). *Academic Capitalism: Politics, Policies and the Entrepreneurial University*. Baltimore: Johns Hopkins University Press.

Wagner, R.B. (1989). *Accountability in Education: A Philosophical Inquiry*. New York: Routledge.