System dynamics and university management

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Abstract

Contemporary management of the national university system in Australia is characterized by the pursuit of government goals through the linking of funding to expressed priorities. Competitive elements of policies at the national level have been translated by individual institutions into management strategies that promote competition between internal units such as faculties and schools. This is in addition to the competition that has been encouraged between the universities themselves in areas such as student enrolment and research productivity. Within these organizational contexts a variety of system archetypes can be identified ''plying their trade''. Efforts to contain debt by staff attrition, competition between institutions for students, setting of goals for enrolment levels, and distribution of scarce resources on the basis or research activity provide contexts for the manifestation of delayed feedback loops, escalation, sliding goals and 'tragedy' scenarios. Following illustration by means of example, some experiences of attempting to introduce system dynamic concepts into decision making discussions are shared.

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It is relatively rare for a 'new industry' to be designed virtually overnight and to immediately become the object of public scrutiny and internal re-organization. Such, however, has occurred with the higher education systems in Britain and Australia. Institutions have found themselves thrust into a competitive corporate environment, but it is the way systems are being orchestrated by government that has created the image of a new industry.

Trow (1994) has discussed the impact of managerialism on the academic profession in which official assessments of quality are linked to funding mechanisms for institutions. While his paper centres upon England all of its concepts and much of its detail apply also to Australia.

Trow identified two distinct forms of managerialism:

- *Soft managerialism* that seeks to promote higher education of quality at its lowest cost and is concentrated upon improving the ''efficiency'' of an institution as it currently exists.
- *Hard managerialism* that argues for the reshaping of higher education through the introduction of new management systems that then become a continuing force within higher education.

The hard approach includes the establishment of criteria and mechanisms by which outcomes of educational activities are assessed, with consequent

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"reward and punishment of institutions" through the linking of such assessments to funding. The associated withdrawal of trust in universities has in short forced the creation of "bureaucratic machinery and formulas to steer and manage the universities from outside the system".

The argument runs that universities, having been assessed as "backward, conservative, self-serving institutions", must in part at least be responsible for depressed national economic performance. Being of their traditional ilk they must, *ipso facto*, be incapable of reform from within and thence must be forced to reshape their roles, missions, and functions. Hence, government support for universities must be accompanied by policies that will ensure greater efficiency and relevance, and must not provide subsidized means for allowing a return to "bad old ways". In summary, the way to achieving more efficient and effective work from university employees is to generate a competitive environment for academics in teaching and research, and then to tie rewards to greater perceived "on the job" performance.

With respect to Australia a parallel development was foreshadowed in a Federal Government policy statement in Higher Education (Dawkins 1988):

> The Government restates its commitment to a higher education system which offers teaching, scholarship and research of the highest quality.
>
> The Commonwealth will identify national goals and priorities for the higher education system, and ensure that system-wide resources are allocated effectively in accordance with these priorities ... Government supports a funding system that responds to institutional performance and achievement of mutually agreed goals. It intends to develop funding arrangements that take into account a range of output and performance measures.
>
> Under the Government's arrangements for a unified national system of higher education, institutions will be funded on the basis of merit and achievement ... measures will be implemented to encourage institutions to be efficient, flexible, and responsive to changing national needs ... will include a greater targeting of resources at the institutional level, improved institutional management, and encouragement of an environment of productive competition between higher educational institutions.

With allowance for a settling down period, the designated unified national system has now been operating for about six years in Australia. As with the UK, it has seen a proliferation of universities, although there has been a tendency towards creating multi-campus structures rather than an abundance of autonomous institutions. See, for example, Mahony (1994). In both contexts a range of former colleges and institutes have been re-designated as universities.

The analogue of Trow's *hard managerialism* is obvious in the excerpts from the policy documents, and government-generated competitive procedures have been instituted in relation to enrolments, teaching quality, research performance, and service.

Soft managerialism is also evident at institutional level in that management has argued that the best way to be competitive at inter-institutional level is to promote a similar culture between units (e.g., departments) within the institution. In this sense university managers tend to act as brokers, translating (and overseeing) federal policies and mechanisms into suitable analogues for distributing resources within institutions.

The structure of the Australian higher education system may be broadly represented as in Figure 1.

Nomenclature for organizational sub-units varies. Individual units are designated as departments or schools, and cognate groupings of these units comprise faculties or groups. There are other variations of this structure. The arrows indicate the direction of devolved resource (money) flow. Goal achievement is synthesized in the reverse direction. Thus, performance at a departmental level contributes to the performance of the respective group, and the cumulative group efforts combine to define institutional performance, which is assessed and "rewarded" by government. This reward is decided on the basis of "hard managerial" policies enacted by government. Soft managerialism operates within institutions, where the argument runs, for example, that schools in competition will maximize their efforts, so enhancing the overall performance of their faculty. Maximizing faculty performance in turn maximizes the total institutional performance, thus meeting government goals and leading to further funding rewards, or at least reducing the likelihood of funding cuts.

To elaborate Figure 1, government money is received in the form of a block grant, which is based on the University achieving an agreed profile with respect

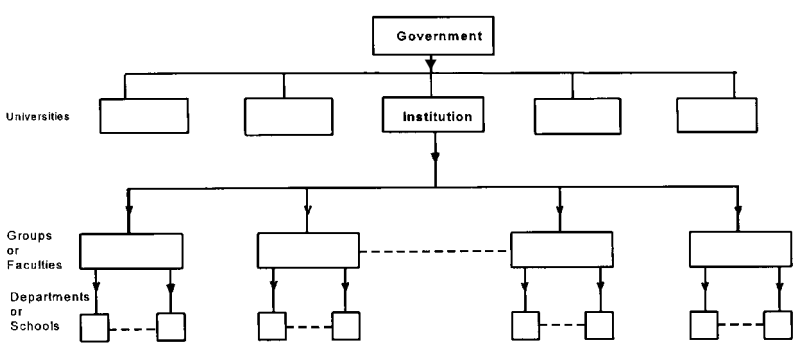


Fig. 1. Higher education structure

to student enrolment and research performance. An amount ''off the top'' is taken for the support of central services such as central administration, library, computer centre, and counselling services, while approximately 60 per cent is made available for disbursement to departments via the faculties or groups. These faculties compete for funds on the basis of student enrolments and research performance, and their chief administrators disburse funds to departments on a similar basis. There is therefore a two-level hierarchy of within-institution competitive structure.

The foregoing has been provided for purposes of scene setting; to provide an indication of the prevailing culture and climate within which universities are being required to function in some national contexts. This paper discusses operational aspects of ''soft managerialism'' as applied by institutional managers, in response to the ''hard managerial'' context that has been set by national legislation and federal administrative action. This latter may be taken as a ''given'', whereas the former contains ''choices'' that are within the decision-making province of the institutional managers.

From the viewpoint of a system dynamicist the developments provide a mixture of stimulation and frustration. Stimulation, because of the number of dynamic concepts and system archetypes that have emerged quickly within a closely defined area of practice. Frustration, because a number of the decisions and management strategies clearly lack the insights we associate within an understanding of the way that systems work. Variations of a number of the system archetypes as summarized, for example, in Senge (1990) can be identified among the decision-making mechanisms currently operating. It is my intention here to illustrate examples of these and to relate some experiences of raising system dynamics concepts within decision making forums.

Contextual definitions

Of fundamental significance is the observation that the system boundary varies with the level of resolution and the domain of the decision making. Three areas of operation may be identified for discussion of ''soft managerial'' action. The first and broadest of these involves inter-institutional competition (top level of structure in Figure 1), for which the system boundary includes institutions within a given geographical area. (With some minor variations associated with external studies provision, Australian Tertiary Education remains essentially state based with respect to enrolment patterns.)

The second area involves competition between faculties in an institution (middle level in Figure 1). The faculties compete for both enrolment dollars and

research dollars, and the relevant system boundary includes all faculties in an institution.

The third area involves competition between individual schools within a faculty (lower level of Figure 1). This is in structural respects a replica of inter-faculty competition, and the system boundary includes all the schools within the faculty.

At all levels policies are enacted to manage enrolment levels, research performance, and financial circumstances (debt or surplus), to which purpose strategies intended to maximize the interests of the relevant unit (university, faculty, or school) are put in place. The details of these vary, according to the perceptions and emphases of individual managers, so that the response to a given circumstance within different units may be different.

Operating characteristics

The institutional environment contains competing universities, the pool of potential students, and the labour market for graduates. Government funding is on the basis of student load. This is, each institution is funded in terms of the number of undergraduate students and postgraduate research students representing the agreed profile for that institution. If the profile numbers are not reached, then funding in the next time period is reduced in line with the shortfall, and places not filled may be relocated elsewhere. If the profile numbers are exceeded, the institution must bear the stress of over-enrolment without supplementation. Since loss of funds is considered far more serious than excess numbers, the practical outcome is a tendency to over-enrol to ensure numbers are maintained across the institution as a whole and to require sub-units (faculties and schools) to bear the consequences of resulting adjustments.

In programs such as medicine and veterinary science, student demand always exceeds available places and a quota system operates rigorously, with very stable enrolment patterns over time. This is largely due to the strong influence exerted by professional groups such as the Medical Association in controlling conditions in the relevant section of the labour force. In most faculties, however, different circumstances prevail, for in fields such as arts, science, education, engineering, commerce and economics, variations in supply and demand mean that changes in enrolment patterns are common, with consequent stresses impacting unevenly across an institution.

The pressure to maintain total university numbers combines with prevailing societal conditions to encourage those faculties currently favoured by buoyant demand to over-enrol at the expense of those going through a period of moderate or reduced demand. The immediate pain of larger student numbers is

considered to be more than offset by the additional inflow of future funds as a result of the relative enrolment increase. The funding formula used to distribute resources to faculties has the form:

$$\$_i = \left(0.85\,\frac{\mathrm{FI}_i \times \mathrm{SLU}_i}{\Sigma(\mathrm{FI}_i \times \mathrm{SLU}_i)} + 0.15\,\frac{R_i}{\Sigma R_i}\right)G \tag{1}$$

where $\$_i$ represents the dollar allocation to faculty i, FI_i represents the weighting index for faculty i, SLU_i represents the student load units of faculty i (three-year average), R_i represents the research index of faculty i (three-year average) computed according to Eq. 2 below, and G represents the total funds available for allocation.

The research index is calculated by means of the formula

$$R = \lambda_1 p + \lambda_2 g + \lambda_3 t \tag{2}$$

where λs are multipliers (that sum to 1) and p, g, and t are respective counts of publications in approved outlets (p), external research grants (g), and research student graduations (t). Typical values for the multipliers are 0.5, 0.3, and 0.2 respectively.

The current discussion relates to the impact of the first term in Eq. 1—the student load factor.

A structurally similar formula operates within individual faculties to distribute funds to their schools. Hence the proportional nature of the funding mechanism with respect to student load means that there is a direct effect at faculty level, and a multiplier effect at school level. For example, if a school suffers a downturn in demand, the effect is felt first at faculty level, whereby the faculty is disadvantaged proportionately relative to its peers. The application of a similar allocation process within the faculty then ensures that the impact on the school is multiplied by assigning a reduced proportion of the faculty resources—from a pool already depleted as a consequence of the unfavourable balance at faculty level.

In consequence of these operating policies "artificial" debt-surplus relationships are generated between faculties, and between schools within faculties. The situation is "artificial" in that the existence of internal debts and surpluses are artefacts of the institution's own structuring and are generated whether or not the institution as a whole is in a healthy financial state.

The generation of "debts" and "surpluses" through which various sub-units are deemed to be in debt (or not) to other sub-units has led to debt-management strategies as manifestations of "soft-managerial" policies. These strategies centre around the management of staff numbers as the principal means of controlling or expending debt or surplus situations. At the same time a variety

of strategies have been adopted at school, faculty, and institutional levels to address the respective stresses, challenges, and opportunities that are perceived to be significant in meeting organisational needs.

System archetypes

The appearance of forms recognizable as system archetypes occur as consequences of administrative responses to the challenges of institutional management. These appear at different levels of resolution, in different sectors of the organization, and typically have quite different system boundaries. To illustrate this aspect of current institutional management it is intended to discuss two instances without detailed elaboration, and to expand on two others at greater length.

A delayed negative-feedback process underlies debt management strategy as it is applied at school level. As described previously, one consequence of a competitive funding formula combined with uneven enrolment patterns is that some schools (faculties) will be in debt when others are in surplus. Moral pressure is then exerted by managers, who point out that some parts of an institution are subsidizing others. The financial imperative is to eliminate the debt and a popular strategy (because it is easy to apply) involves allowing natural staff attrition to reduce the debt through the accumulation of salary savings over time.

A policy adopted by faculty managers is to make staff refurbishment and regrowth contingent upon a school controlling and eliminating its debt. This is rendered easier if enrolment growth occurs, but difficult if enrolments remain depressed, or reduce from the current state. Heads of schools in debt are given a time (say three years) over which to achieve a balanced budget and an indication as to which forthcoming resignations will not be replaced. When combined with the average period of employment of long-term staff (tenure), which strongly affects rates of resignation, the delays introduced into the negative-feedback process (goal state of zero debt) mean that non-replacement can continue beyond the level needed to eliminate the debt during the ensuing time period. Schools find themselves in surplus but with a diminished base from which to rebuild, and unable to take swift advantage of positive changes that may occur in their operating environment.

An ‘‘enrolment race’’ with a growth limit is descriptive of the pattern of activity in some newer areas of tertiary provision. In the higher education sector in Australia institutions now find themselves competing in ways that did not occur in the previous organization. Nowhere is this more evident than in the

field of education itself. Former colleges of advanced education responsible for primary teacher training in particular, have become faculties of new universities. As such, they have diversified into offering courses that place them in direct competition with (generally smaller) education faculties of established universities in the same region.

New markets have been stimulated by the increase in providers with attendant aggressive advertising and a range of inducements to enrol. In particular, a market for coursework higher degrees has ''taken off'' in an area that previously sustained a steady but relatively small demand for awards which required a substantial investment of effort on the part of students. The area has been seen as a growth domain by new providers in particular, who need to find markets to maintain staff establishment in the face of a reduction in some pre-service teacher preparation courses. Because of the relatively small numbers of teachers holding higher degrees by coursework, the market in these early years has appeared ''unlimited''. Competition for growth between institutions has resulted in inducements such as a shortening of degrees (from four or three semesters to two) by some universities, and other responses in terms of credit for workplace learning and other course credit dispensations. The effect has been an enrolment race with institutions watching each others' numbers and endeavouring to retain or improve their relative positions. In practice, a limit to growth will intervene to curtail the escalation—for example, the existence of a bound on the number of potential students in the profession or the looming imposition of an increased fee structure for second degrees. As this future bound begins to have an effect, we can expect a fall in the rate of enrolments, creating problems for institutions that have built programs at ever increasing rates.

In order to continue to attract more students (delay the impact of a bound), universities driven by this demon will be tempted to apply even more of the measures (e.g., course shortening and large class groups) already employed to boost course numbers. The outcome is likely to be a decaying product and lower service quality—in a single-minded drive for numbers, the erosion of quality leads in the direction where the only attraction is a ''quick degree''. Shades of People Express Airlines! We have not yet reached this point, but the maintenance of a slightly longer but quality degree is the path suggested by corporate precedents.

Responding to under enrolment

As noted previously, institutional conditions can vary quite widely amongst those faculties subject to a waxing and waning of student demand. In

particular, a unit coming off a buoyant period can be tempted to "enjoy" a respite with still healthy funds, fewer students, and better conditions for staff to pursue their academic interests. Particularly risky is the mental outlook that views such a downturn as an aberration after some good years, with a consequent temptation to ride out the storm. The operation of delayed feedback deriving from earlier activity means that supply and demand conditions tend to persist for a period; for example, as a consequence of the pipeline effect of graduate enrolment continuing to produce qualified labour after the publicized shortage (that led to the increased student interest) has been met, so reversing the public perception of need.

So the response to under-enrolment can vary from complacency to intense activity, and simple models can help to indicate the longer-term implications of particular responses. The following model is a conceptual model intended to raise consciousness within individual units (faculties or schools). It was designed as a result of conditions emerging in the author's Faculty.

Figure 2 contains a causal loop diagram that describes the simplified operation of a faculty in relation to its student intake. The most common internal reaction on the part of staff in reviewing performance is to compare the current year with the previous one. If times are good, then matching last year's effort is seen as quite acceptable. If times are tough, then a tempting argument

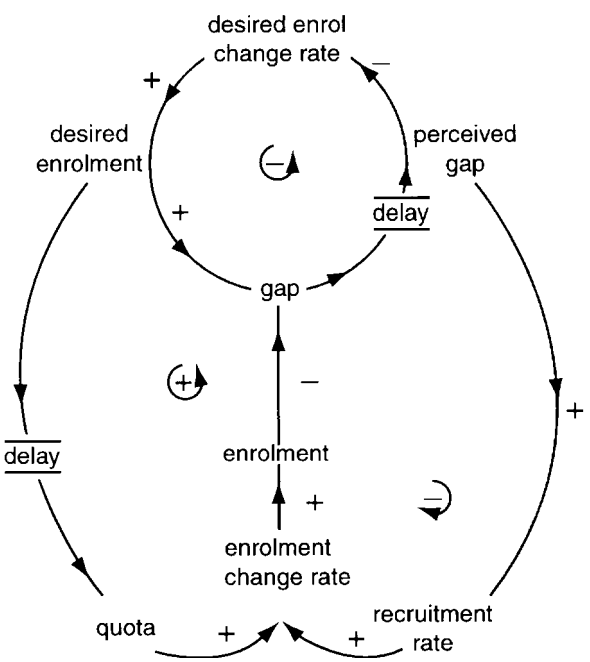


Fig. 2.
Underperformance

is "We've got 90 per cent of last year's numbers so that's pretty good!". This effectively lowers the desired enrolment target, which in buoyant equilibrium conditions is the same as the actual enrolment and the quota. If the perceived gap between desired and actual enrolments widens, activity is stimulated to attract more students through means such as publicity and advertising. Such effort tends to achieve some enrolment increase, so reducing the gap and easing the pressure on recruitment efforts.

It has been pointed out that in faculties of this type quotas act as general targets, being enforced only in some high-cost/high-demand programs. To the extent that they provide a degree of elasticity for the university to "shift students" in the interest of meeting total load, they are reviewed periodically with the notional targets adjusted in favour of faculties experiencing increased demand. In this model the quota is represented as a five-year average of desired enrolments and the model behaviour is robust with respect to this averaging time.

With respect to Figure 2, the growth engendered by the positive loop is controlled by the two negative goal-seeking loops for which desired enrolment provides a variable target.

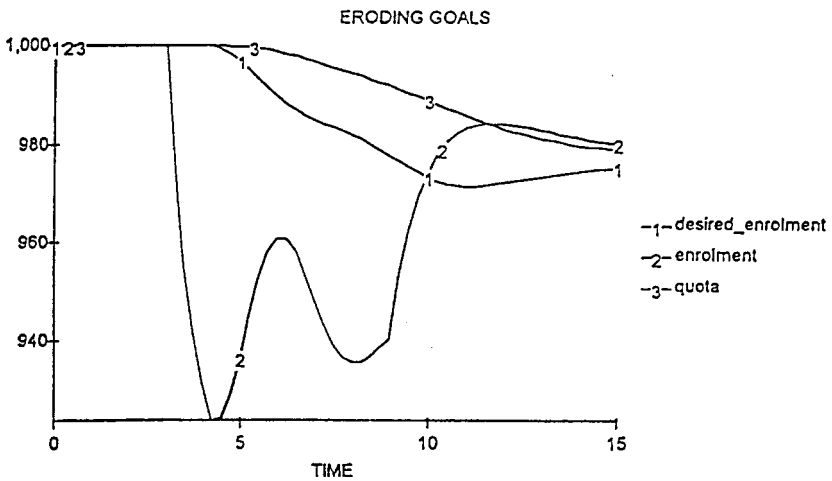
For purposes of illustration the process is started in equilibrium with a basic intake of 1000 per year. This is the base application rate, which is set initially to match the quota. At $t = 3$ there is a 10 per cent fall in demand so that the base application rate drops to 900 and remains there until $t = 9$, at which time it reverts to its original value. This simulates the situation in which a faculty suffers a period of downturn in demand and then must respond to an increase.

The outcome of the simulation is shown in Figure 3. The sudden sustained downturn in enrolments results in the desired enrolment and quota drifting downwards until the base application rate recovers and numbers increase. Recruitment efforts combined with a downward drifting desired enrolment combine to cause fluctuation in the enrolment before the upsurge at $t = 9$. The factor of interest, however, is that, even though the base application rate returns to 1000 at $t = 9$, the sliding goal (desired enrolment) has depressed the quota so that the enrolment does not reach the potential value of 1000. Even though the quota is being met (slightly exceeded) the faculty is underperforming according to its potential market.

Research based funding

In response to federal "encouragement" to increase productivity, universities have instituted various incentive schemes to make individual units more active.

Fig. 3. Enrolment levels

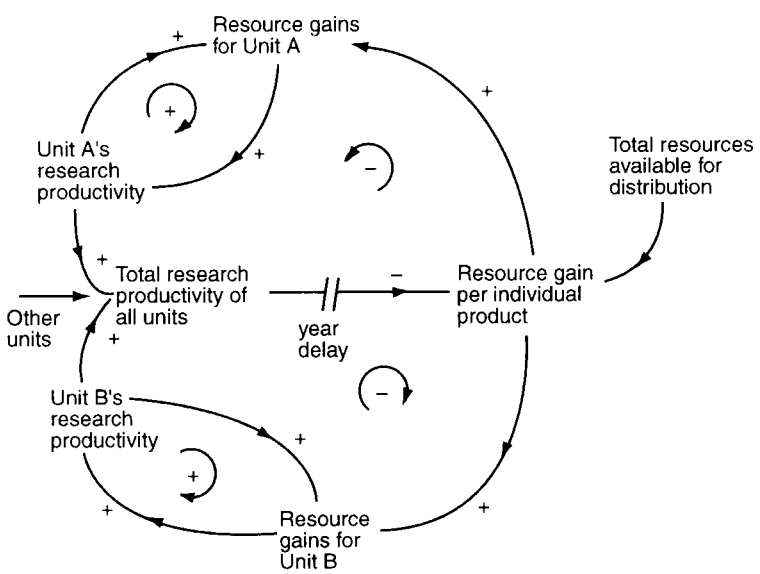


One such scheme allocates a substantial portion of its teaching and research budget on the basis of research productivity.

Research products are calculated yearly by means of Eq. 2.

The distribution formula represented by the second term in Eq. 1 allocates available funds on a proportional basis between competing units using the previous year's research products to determine the proportions. (Alternatively, average research output over a period (say three years) may be used.) This allocation policy is represented in the causal loop diagram shown in Figure 4.

Fig. 4. Research-based funding



The model contains three units, which is the minimum number necessary to capture the competitive structure. Only two of these are represented in the diagram for purposes of illustration.

The positive loops in Figure 4 indicate that an increase in the research productivity of a unit will lead to resource gains, which in turn enable further productivity and hence further gains. The negative loops are regulating or balancing in their effect. The top negative loop indicates that an increase in the productivity of unit A will contribute to the sum total of research products produced by all units. This in turn means that the resource gain per individual product is reduced, which reduces the resources assigned to A, which in turn reduces As productivity. The bottom loop is a replica for unit B.

The three units produce an initially constant output of 50, 100, 150 research products per year with an arbitrary amount of $40 being earned per product. Model behaviour is determined by model structure and is totally insensitive to the magnitude of these values. At $t = 3$ the units increase productivity (Figure 5) in response to the introduction of the competitive allocation policy. In times of funding growth the total resources available for distribution increase annually and, theoretically at least, all units can gain.

The present reality is that, whether or not there is an increase in productivity, no increase occurs in the funds available for allocation. So we now consider the case in which productivity increases as before, everyone works harder (Figure 5), unit 1 gains a bit, unit 2 treads water, and unit 3 actually loses resources (Figure 6). Of course, there is a "losing" situation for someone even under conditions of funding growth, whenever this growth is less than the average rate of productivity increase.

Ironically, in the absence of funding growth, every additional publication, every additional grant obtained, and every additional thesis student graduated

Fig. 5. Research production by unit

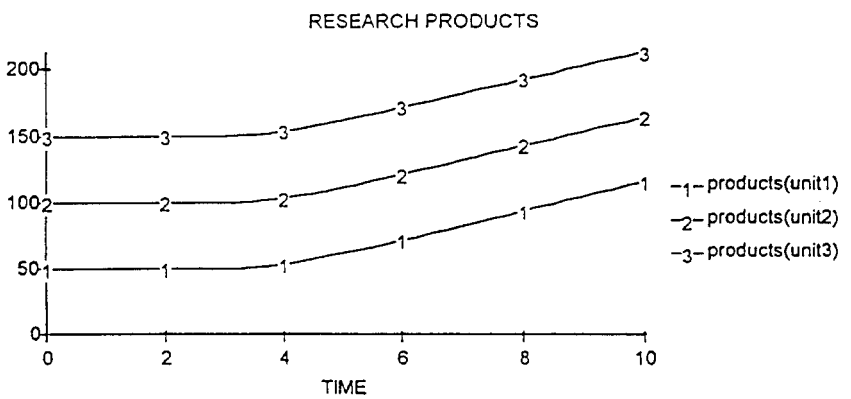
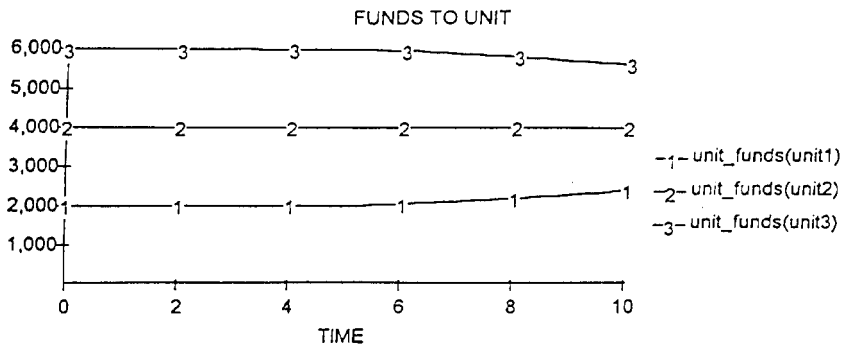


Fig. 6. Research funds to unit



helps to ensure that less is obtained for that unit of effort than for the previous one.

As an archetype, this structure might be considered indicative of "success to the successful". However, even the "successful" are scourged and I believe it is more appropriate to view the situation as a version of the "tragedy of the commons" since:

1. there exists a "commons" or a resource shared among a group of competing units, and
2. the units are free to dictate their own actions so as to maximize their own gain from the "commons".

The commons is rendered less and less productive per individual demand as the units work harder and harder for less and less.

As an illustration, the Faculty of Social Sciences increased its publications by 38 per cent between 1991 and 1995; yet its percentage share of the budget fell by 2 per cent because other faculties achieved marginally higher output.

Despite this, management remains pre-occupied with the Titanic's deck-chairs in the form of the multipliers in Eq. 2. All manner of energy is dissipated in arguing whether they should be moved a few points, while the funding ship heads for deep water under a load of research products.

Flying the flag

In this section I will describe some experiences of raising system dynamics concepts in various decision-making forums.

There has been one system concept, effective on more than one occasion, in more than one setting, and yet based on one of the simplest of all dynamic

principles. This is simply the appreciation that the height of a level can be supported or increased by restricting the outflow as an alternative to increasing the inflow. The context is the competition for students with other institutions (enrolment race) and means for attracting more students into courses.[1] Great emphasis has been placed on increasing the numbers entering courses and a short course length has been put forward as a major incentive. The rate concept has typically been introduced in the form of a question such as "Do you realize that reducing that course from three semesters to two means that we will need to increase our intake by 50 per cent just to break even?". The invariable reaction has been a metaphorical catching of breath.

A second dynamic concept to create an impact has been the significance of system feedback when introduced into discussions where it had either not been appreciated or been ignored. Two particular examples come to mind. One of these relates to the elimination of departmental debt as described earlier in the paper. The improvement of departmental finances through the intake of funds and through salary savings from resigning staff have regularly been presented as unrelated strategies. In fact, the university's funding mechanism allocates 15 per cent of resources on the basis of a three-year rolling cycle of research products, and the highest contribution to student load income comes from doctoral students who are linked individually to staff members. The delayed impact of feedback from staff resignations on future funding is considerable—in fact, we have shown that the loss, without replacement, of a staff member of average research productivity and supervisory load costs about half a lecturer's salary in lost income per year. Consequently, budget planning, based on salary savings alone, gave a wholly too optimistic view of the rate of debt reduction. Realism in such matters is important for morale, which in hard times is more than usually vulnerable to disappointment.

A second example involving hidden feedback arose when the University Research Committee moved to amend Eq. 2 for the distribution of internal research funds, so that 50 per cent of the weighting would be assigned to the monetary size of external research grants, with the other 50 per cent assigned to all other research products. The effect would be a major redistribution of funds in favour of faculties that engage in big project research (such as Science and Engineering) and away from Social Sciences and Humanities in particular. The supporting rationale presented the proposal as an incentive to Humanities to improve their grant achievement rate and argued that the faculty could claw back to its present position by increasing other forms of research output such as publications. The argument is seen to be specious when it is recognized that, for the disadvantaged faculties, the internal research money is the lifeblood of modest-cost projects that are highly productive in terms of publications.

Depriving faculties of this source would further curtail the ability to compete, so that the position would worsen. Simultaneously, additional research funds to the other faculties would facilitate their output so ensuring a rich–richer and poor–poorer outcome. While direct equity arguments were the most prevalent, the feedback argument was presented and appeared to make its own contribution to the defeat of the proposal when first presented. It appears however that this issue is still active.

A sliding-goals context emerged during meetings to review course enrolments in relation to the financial situation of my school. The method of analysis involved comparing the current year's progressive figures with the known data from the previous year. In fact, there was concern to exceed the previous year's enrolment, but one sensed that motivation for this was the departmental debt, rather than the principle of holding a goal, and that the significance of the latter was submerged by the financial context. In a situation of surplus last year's figures may well have been a good enough target to "almost reach", so that in this university context sliding goals may well be a greater threat in good times than bad. With respect to promulgation of system dynamics thinking, there was a sense that the "learning moment" was confounded by a particular condition, i.e., the debt situation.

As suggested earlier, a "tragedy of the commons"-like structure is at the centre of concerns about the effect of the funding formula (Eq. 1) used to distribute resources to the six faculties.

The problem behaviour is generated as each faculty strives to increase its particular R_i in a situation where G is effectively fixed. A highly performing faculty or department has nowhere to go but down. While both terms of Eq. 1 have a similar proportional structure, the first term is controlled by factors that just happen to be consistent with principles necessary for managing a commons. The student-load term has inbuilt constraints on the growth of individual claims through the exercise of quotas and the ebb and flow of student demand.

In contrast to the checks and balances exercised on the student-load term the university culture actually exacerbates the problem in relation to the research component. Individual rewards such as promotion accruing to academics on the basis of increased research productivity assure an increasing output of research products that compete for the available resource dollar. This is the antithesis of the restraint necessary to manage a "commons" so that a reasonable rate of return per product is maintained. This is presently the major issue on which I am trying to spread system dynamics thinking and, while marked success cannot be claimed thus far, circumstances are beginning to create a possibly more receptive climate. The figures, indicated earlier, that

show a 38 per cent increase in publications associated with a 2 per cent drop in resources are recent at the time of writing. We shall keep trying.

So we are living through interesting times. Usually involvement in administrative detail forms a cloud interfering with the pursuit of academic interests. This time, at least, the cloud has some kind of silver lining.

Notes

1. In Australia course means degree. For example, a one year Masters degree would be a two-semester course.

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