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**A model for considering the financial sustainability of learning and teaching programs: Concepts and challenges**

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**Abstract**

The expansion of tertiary education, an intensity of focus on accountability and performance, and the emergence of new governance and management structures drives an economic fiscal perspective of the value of learning and teaching. Accurate and meaningful models defining financial sustainability are therefore proposed as an imperative for tertiary institutions in order to determine the long-term feasibility of learning programs. ‘When there’s only so much sunshine each day—where should the light be shone?’ Well, at risk of allowing pure economic rationalism dictate which learning programs thrive and survive in the ‘winter sun’, institutions should understand that an adjustment to classic models of financial sustainability are necessary by acknowledging educational value. That is, these kinds of adjusted models require methods for quantifying three main elements in the learning production environment—educational value, costs, and revenue.

There is an inevitable complexity in describing and quantifying all three of these elements in the context of a university learning environment. This paper introduces the concept of a learning program financial sustainability model (suggested by Bill Massy), an outline of possible approaches to quantifying its three essential elements (educational value, cost, and revenue), and some of the challenges confronting planners with responsibility for its form and operationalisation.

For the particular interest of those staff involved in student load modelling, finance, teaching and learning quality, pedagogy, and performance management.

**Key Words:** financial sustainability, student load modelling, activity-based costing, pedagogy, performance management, higher education

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There is an intensity of focus and strong commitment to better understanding and institutionalising the notion of ‘financial sustainability’ within universities. Planning models and systems to support the development of tools for managers to

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help their understanding and guide decision-making are therefore imperative. Some aspects of these models and systems are inevitably well embedded and systematic. For example, all Australian universities have a basic predictive student load/revenue modelling process that supports business processes like budgeting. However, elements of this process and many other processes in the financial sustainability space are still evolving and are yet to mature. This is certainly the case at Flinders University.

Contextually, the Macquarie Dictionary's (1982) best definition of 'sustainability' is being able to 'endure without giving way'. Financial sustainability could therefore be conceived as the ability of an entity or effort to economically endure time. This article looks at the development of methods for modelling components of both sides of the equation (academic value, revenue and costs) informing the financial sustainability of teaching and learning programs at a higher education institution. Specifically, these models are framed using Massy's (2004) very simple perspective of universities as economic not-for-profit entities. That is, recognising that the financial sustainability of programs should not just be determined by their ability to make a financial profit (as is appropriate for a 'for-profit' enterprise). Massy suggests that universities, as not-for-profit institutions, should moderate financial aspirations by considering non-financial 'value-added' outputs. This model is discussed later in more detail.

The intention here is not to prescribe a complete financial sustainability framework for teaching and learning that accounts for the unique nature of higher education and, of course, the institution itself. This would be the ultimate, longer-term goal. However, consideration of some elements are considered as fundamental to directly or indirectly move universities in a positive direction when considering the financial sustainability of teaching and learning programs, specifically conceptual and technical considerations of how best to derive (student load) revenue and (human resource) costs. To set the context, a discussion of various relevant aspects of current international and national pressures is provided.

### ***Why New Models for Measuring Financial Sustainability Are Now Imperative***

An Organisation for Economic Co-Operation and Development (OECD) (2008) review of tertiary education policy was conducted from 2004 to 2008 in collaboration with 24 countries around the world. A number of major global trends were identified as follows: the expansion of tertiary education, provider diversification, an increase in the mix of students (e.g., socioeconomic background, ethnicity, previous education), differential funding arrangements, an intensity of focus on accountability and performance, emergence of new governance structures and globalisation.

Very similar themes are reflected in government higher education reforms within Australia. The Commonwealth Government's response to the 'Bradley Review' (Department of Education, Employment and Workplace Relations [DEEWR], 2008), *Transforming Australia's Higher Education System* (DEEWR, 2009) listed a number of analogous key reforms, including the maintenance of a growing but sustainable higher education sector. From 2012, a student-centred funding model will be introduced for Australian public universities that will see the federal government fund all undergraduate Commonwealth-supported places free of existing caps. The Gillard Government committed an extra \$1.2 billion in the recent

2011 budget for these extra places and announced it expects total expenditure on higher education to increase to \$13 billion in 2012 from \$8 billion in 2007 (Carr & Evans, 2011). This confirms their commitment to this key reform announced in 2008. Sustainability initiatives that include new indexation arrangements and a review of base funding will, theoretically, enable institutions to better keep pace with the increasing costs of higher education—but explicit in the government’s commitment is also a requirement for productivity improvements (DEEWR, 2009).

As foreshadowed by Alexander (2000), institutions are increasingly required to respond to the changing international and national landscape described above. This inevitably requires governments to gain greater control over institutions, with associated mechanisms for public accountability. In reflecting a greater utilitarian view of higher education in the drive for increased productivity and performance, the sector increasingly views economics and the quantification of fiscal resources as the true measure of ‘value’. Accurate prospective financial models around these kinds of measures of ‘value’ indicating future sustainability are therefore an absolute imperative.

### ***Financial Sustainability Models***

Classic microeconomic theory suggests financial sustainability can be modelled through a ‘Marginal-Revenue-Marginal-Cost’ approach (Jackson & McConnell, 1980). The means for determining the behaviour, including viability, of a ‘for-profit’ competitive entity is to calculate and compare, at each price level, amounts that each additional unit of output would add to total revenue on the one hand, and to total cost on the other. That is, in comparing the marginal revenue (MR) and the marginal cost (MC) of each successive unit of production, any unit whose MR exceeds MC should be produced and any unit whose MC exceeds MR should not. The equilibrium point where MR equals MC is the key to the output-determining rule that suggests the entity will maximise profits or minimise losses by producing at that point where MR equals MC (Jackson & McConnell, 1980).

Assuming that price is determined by the broad market forces of supply and demand, as is the case for pure competition, an entity will remain financially sustainable by maximising profits or minimising losses in the short run by producing outputs at which MR equals MC if, and only if, MR is greater than minimum average variable cost (AVC). Here, AVC is the total of all variable costs (i.e., those that vary with output like labour, materials, power) divided by output (Jackson & McConnell, 1980). If MR falls short of minimum AVC, the entity will minimise its losses in the short run by closing down. In this case, there is no level of output at which the entity can produce and realise a loss smaller than its fixed costs and it is therefore considered (financially) unviable (Jackson & McConnell, 1980). Note that this assumes the absence of any subsidisation over time to ride out short-term losses.

As the specific focus of this article, the classical microeconomic theory described above is now considered as a basis for considering the (financial) sustainability of an academic program within a university context. While for a ‘for-profit’ entity is, in theory, concerned exclusively with financial sustainability, when considering viability, a ‘not-for-profit’ entity like a university, or teaching and learning segments (program) within a university, must consider other factors (Ferns et al., 2007; Massy, 2004; Michael, 1998).

In the context of a ‘not-for-profit’ organisation like a university, Massy (2004, 2007) suggests an adjustment to the classic output-determining rule ( $MR = MC$ ) by acknowledging the need to consider value-added or non-financial contributions to output. That is, the ‘not-for-profit’ output-determining rule is augmented by the addition of a marginal value (MV) measurement of output in addition to MR. Or algebraically,  $MV + MR = MC$ . The theoretical implication is that academic programs will maximise the overall value of teaching by teaching at the (output) point where MV plus MR equals MC, subject to the constraint that total revenue (TR) equals total cost (TC) or, equivalently (as in the for-profit case), that average revenue (AR) equals average cost (AC). And so, in the absence of any kind of subsidisation, if MV plus MR equals MC if, and only if, TR equals TC equals 0, the program will theoretically close down. Or more realistically, the university would move to close the program down.

So in modelling a framework for assessing the (financial) sustainability of an academic program in this way, it is obviously necessary to consider the academically contextual composition of the elements of the output-determining rule. That is, the composition of academic value (MV), revenue (MR, AR), cost (MC, AC) and output/production, and methods for their retrospective, actual, and prospective quantification.

### **Academic Value**

Academic value, as the essential discriminating characteristic between the ‘for-profit’ and ‘not-for-profit’ sustainability construct, is the most complex element to describe and quantify (Ferns et al., 2007, Massy, 2004).

Massy (2004) discusses the complexities of describing and quantifying this value-added component in the context of a university, including the effect of the investment of public money on the expectation of production of ‘public good’ or contribution to mission, and its inevitable abstract, ambiguous and qualitative nature.

Ferns et al. (2007) attempt to construct the notion of academic value around quality and relevance, but make no attempt to quantify this value in dollar terms. The overall sustainability assessment of programs is ultimately based on judgment using a business intelligence natured rating system (green, amber, red), after taking into account a number of metrics indicating quality, relevance and financial position.

While it is naturally complex and would require some original research, the derivation of MV in dollar terms is not inconceivable. It could potentially be based on some quantification algorithm using the kinds of measured quality and relevance characteristics in Ferns et al. (2007)—including student opinion, graduate employability, progress, retention, market and policy imperatives, and demand. In the absence of a currency derivation, management could at least determine, based on value judgment, whether the deficit between revenue and cost justifies consideration of cross-subsidisation.

### **Cost**

A number of approaches to the derivation of costs for educational programs are proposed in a meta-analysis of the literature by Swift (2010). These include macroeconomic, accounting and activity-based costing (ABC) models.

Macroeconomic approaches generally involve methods of estimating costs by considering multiple institutions or whole sectors (Swift, 2010). For example, Johnes and Johnes (2009) proposed a parametric cost estimation methodology for English institutions allowing for inter-institutional differences in nature (size, discipline mix, and specialisation).

Accounting costing methods allocate a budget expenditure to academic organisational units. Costs of all non-academic activities like research, community engagement, administration and associated overheads, are excluded and the remainder assumed to provide a measure of educational costs (Swift, 2010). This accounting method for determining educational costs is common.

Activity-based costing (ABC) is a costing methodology that attempts to identify activities in an organisation and allocates the cost of each activity to the programs, within operational units, that the activities support. The key elements that define ABC structure are resources, activities, products, and drivers; and the underlying assumptions are that products undertake activities, and activities consume resources that have a cost. Activities are costed and linked to the products by a driver, viz any factor that cause resources to be consumed (Carlson et al., 2009; Massy, 2010; Swift, 2010).

Ismail (2010) suggests, despite its slow take-up, there is a growing body of evidence suggesting ABC offers significant management advantages to organisations— including the ability to more accurately estimate costs, clarity around what causes costs to exist, and more relevant intelligence for strategic decision-making. Ismail (2010) takes this one step further and suggests that ABC can be used to drive activity-based management (ABM) practice, particularly for service organisations such as universities.

ABM refers to the use of ABC information to understand and to make beneficial changes in the way institutions do their business in an environment of limited resources and increasing demands. It is a strategic tool that allows managers to: quantify the value of products and services; use a common language for benchmarking; look at their activities with a process view; and choose courses of action based upon ABC information. (Ismail, 2010, p. 42)

Ismail (2010), through consideration of the literature, concludes that ABC is the only methodology that provides a university with the ability to properly gauge the amount of resources that are consumed by individual programs and students and by the teaching activities and processes that deliver educational services to these students.

An application of ABC to model the costs of an academic program is illustrated by Massy (2010). This model is a variation of classical ABC and is an illustration of how ABC facilitates the kind of positive ABM discussed by Ismail (2009). Students (products) undertake learning activities like classes, preparation and other out-of-class actions, and these activities consume human teaching resources (staff), which have a cost. Teaching activities are costed and related to the students by program enrolments (the driver) via resourcing and costing models. The important point here, without going into detail, is that the Massy (2010) ABC model not only provides a mechanism to estimate educational costs, but also a management structure to consider how various program design structures compare financially in the context

of learning quality. Massy (2010) advocates the integration of an ABC model within a program redesign structure with the ultimate goal of improving student learning and retention, while at the same time reducing the costs of delivering these programs by as much as 80% (the average is a good deal less, though still very significant).

### **Output and Revenue**

In Australian higher education it is appropriate to consider the notion of output and revenue together. Funding is predominantly a direct function of output measured directly by enrolments as equivalent full-time student load (EFTSL), referred to simply as student load. Within Australian universities, methods for determining revenue on the basis of student load tend to be based on well-established accounting practices. Funding (revenue) for Commonwealth Government-supported domestic students, whose liability is deferred through the tax system, is dictated by the national Higher Education Contribution Scheme, providing a method for determining student contribution to revenue, and the Commonwealth Grant Scheme, providing a method for determining government contribution to revenue. The details of these structures are currently under review (DEEWR, 2010). Funding (revenue) for wholly fee-paying students tends to be determined by individual institutions, considering factors such as the student's residency status and program discipline.

Institutions, with mature student enrolment and financial management systems, are highly adept at determining student load and associated revenue of educational programs potentially informing their financial sustainability. The greater challenge is to do this prospectively in support of advanced planning.

As crucial as it is in supporting forward planning processes, including potentially financial sustainability predictions, there is little in the literature on the development of modelling techniques for projecting student load/revenue. Lightfoot (2008) presented work looking at logit statistical models supporting the prediction of commencing enrolments (student load) from applications. Aitken, Young and McConkey (2009) present a number of alternative statistical models predicting continuing student load. A body of original research is inevitably required at the individual institution level to determine load prediction models with necessary precision. At Flinders, simple student load projection models are currently in use. However, a review is overdue to improve their efficacy in support of a number of related business processes including, potentially, educational program financial viability.

### ***Summary and Conclusions***

The expansion of tertiary education, an intensity of focus on accountability and performance, and the emergence of new governance and management structures drive an economic and fiscal perspective of the value of teaching. Accurate models indicating financial sustainability are therefore an imperative for institutions to determine the long-term feasibility of teaching programs. In the context of teaching programs within a 'not-for-profit' organisation like a university, an adjustment to classic models of financial accountability are necessary in acknowledging the need to consider educational value (non-financial) contributions to educational outputs. These kinds of adjusted financial sustainability models require methods for quantifying three main elements in the learning production environment—educational value, costs and revenue.

There is an inevitable complexity in describing and quantifying the educational value-added component in the context of a university. The effect of the investment of public money on the expectation of production of ‘public good’ or contribution to mission, and the learning environment’s abstract, ambiguous and qualitative nature suggest that, while not impossible, quantification methods are likely to be controversial and problematic. An original body of research would be required to properly consider such methods within a financial sustainability model.

Contemporary thinking has advocated the use of ABC models over traditional approaches to quantify the costs of teaching programs. The ABC models of the kind proposed by Massy not only provide the most accurate mechanism for identifying and estimating the costs of educational programs, but also facilitate better financial reporting, a greater understanding of what causes costs and an ability to optimise the use of learning resources to minimise costs and drive financial sustainability without compromising learning quality. The adoption of ABC models would inevitably require considerable development of supporting processes, systems and cultures.

Methods for determining retrospective revenue, based on student load, generated from teaching activities are generally relatively simple and well supported using standard accounting principles. A complexity is introduced in the estimation of revenue when future projections are required in support of future planning, including a proper assessment of teaching program viability. Current basic methods of future student load and revenue projections at Flinders have served the institution well, but lack the necessary technical sophistication and accuracy to support the financial sustainability models advocated here. An original body of research and development would therefore be required to mature revenue projections models of this kind.

### References

- Aitken, R., Young, A., & McConkey, K. (2009). *Projecting continuing student enrolments: A comparison of approaches*. Retrieved from <http://www.aair.org.au/app/webroot/media/pdf/AAIR%20Fora/Forum%202010/ProjectingContinuingStudentEnrolments-AComparisonofApproachesROBERTAITKEN.pdf>
- Alexander, K.F. (2000). The changing face of accountability: Monitoring and assessing institutional performance in higher education. *Journal of Higher Education*, 71(4), 157–165.
- Carlton, S., Mladenovic-McAlpine, R., Loftus, J., Palm, C., Kimmel, P.D., Kieso, D.E., & Weygandt, J.J. (2009). *Accounting: Building business skills* (3rd ed.), Milton, Australia: John Wiley.
- Carr, L., & Evans, C. (2011). *Record funding for Australian higher education*. [Joint media release]. Retrieved from [http://www.deewr.gov.au/ministers/evans/media/releases/pages/article\\_110518\\_121634.aspx](http://www.deewr.gov.au/ministers/evans/media/releases/pages/article_110518_121634.aspx)
- Department of Education, Employment and Workplace Relations. (2008). *Review of Australian higher education*. Retrieved from [http://www.deewr.gov.au/HigherEducation/Review/Documents/PDF/Higher%20Education%20Review\\_one%20document\\_02.pdf](http://www.deewr.gov.au/HigherEducation/Review/Documents/PDF/Higher%20Education%20Review_one%20document_02.pdf)

- Department of Education, Employment and Workplace Relations. (2009). Transforming Australia's higher education system. Retrieved from [http://www.deewr.gov.au/HigherEducation/Documents/PDF/Additional%20Report%20-%20Transforming%20Aus%20Higher%20ED\\_webaw.pdf](http://www.deewr.gov.au/HigherEducation/Documents/PDF/Additional%20Report%20-%20Transforming%20Aus%20Higher%20ED_webaw.pdf)
- Department of Education, Employment and Workplace Relations. (2010). *Background paper for the review of higher education base funding*. Retrieved from [http://www.deewr.gov.au/HigherEducation/Policy/Documents/BFR\\_BackgroundPaper.pdf](http://www.deewr.gov.au/HigherEducation/Policy/Documents/BFR_BackgroundPaper.pdf)
- Ferns, S., Oliver, B., Jones, S., & Kerr, R. (2007, July). *Course sustainability = relevance + quality + financial viability*. Paper presented at Evaluations and Assessment Conference, Brisbane, Australia.
- Ismail, N.A. (2010). Activity-based management system implementation in higher education institution: Benefits and challenges. *Campus-Wide Information Systems*, 27(1), 40–52.
- Jackson, J., & McConnell, C.R. (1980). *Economics* (Australian edition). Sydney, Australia: MIT Press.
- Johnes, G., & Johnes, J. (2009). Higher education institutions' costs and efficiency: Taking the decomposition a further step. *Economics of Education Review*, 28, 107–113.
- Lightfoot, A. (2008). Predictive modelling of undergraduate student intake. Retrieved from <http://www.aair.org.au/app/webroot/media/pdf/AAIR%20Fora/Forum2008/4-3-Lightfoot.pdf>
- Macquarie Dictionary. (1982). *The Pocket Macquarie Dictionary*. Adelaide, Australia: The Jacaranda Press.
- Massy, W.F. (2004). Collegium economicum: Why institutions do what they do. *Change*, 36(4), 27–35.
- Massy, W.F. (2007). Cost and pricing in higher education. In E. Fiske, & H. Ladd (Eds.), *Handbook of Research in Educational Finance and Policy* (pp. 671–687). London: Taylor & Francis.
- Massy, W.F. (2010, June). *Creative paths to boosting productivity*. Paper prepared for Reinventing the American University: The Promise of Innovation in Higher Education the American Enterprise Institute conference. In: Innovation and Entrepreneurship in American Higher Education, American Enterprise Institute for Public Policy Research. Retrieved from <http://www.aei.org/event/100218>
- Michael, S.O. (1998). Restructuring U.S. higher education: Analyzing models for academic program review and discontinuation. *The Review of Higher Education*, 21(4), 377–404.
- Organisation for Economic Co-Operation and Development. (2008). *Tertiary Education for the Knowledge Society*, Volumes 1 and 2: Santiago, P., Trenblay, K., Basri, E., and Arnal, E. (Eds.). Paris: Author.



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Swift, L. (2010, November). *Evaluation of the sustainability of postgraduate programs in the faculty of the professions at the University of Adelaide*. Paper prepared for the MTEM, L.H. Martin Institute, University of Melbourne.