The measurement and impact of university teacher development programs

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Abstract

Teacher development programs have been part of the English speaking higher education landscape for over 40 years. There is now general agreement that teacher development programs have a positive impact on teachers and students, yet the extent and longevity of their impact on the culture of the discipline and the institutions are less well researched and evidenced. There is clearly a need for ongoing and rigorous research on the impact of teacher development programs that looks deeper and beyond the teachers who participate in the programs. The focus of this paper is to draw on the English research and literature to identify the impact and effectiveness of teacher development programs and activities and propose a framework for the systematic measurement and collection of information on the effectiveness of these programs. It is argued that these measures and indicators need to move from the research paradigm to the evaluation paradigm so that they can inform ongoing and future teacher development programs and enhancement. Programs from the planning stage should be designed to build an evidence base that will enable researchers and practitioners to ask more complex questions on where and on whom the programs have an impact, and why they have impact.

Keywords: teacher development programs; evaluation and monitoring; impact; measuring effectiveness; university.

Resum. *L'avaluació i l'impacte dels programes de desenvolupament de professors universitaris*

Els programes de desenvolupament de mestres han format part del panorama de l'educació superior de parla anglesa durant més de quaranta anys. En l'actualitat existeix un acord general sobre l'impacte positiu que tenen els programes de desenvolupament de professors en els mestres i estudiants, però l'abast i la durada del seu impacte en la cultura de la disciplina i les institucions estan més aviat poc documentats i evidenciats. Hi ha una clara necessitat d'una investigació rigorosa sobre l'impacte dels programes de desenvolupament dels mestres que miri més profundament i més enllà dels professors que participen en els programes. L'objectiu d'aquest treball és fer ús de la investigació i la literatura anglesa per identificar l'impacte i l'eficàcia dels programes i activitats de desenvolupament de mestres i proposar un marc per a la mesura sistemàtica i la recopilació d'informació sobre l'eficàcia d'aquests programes. S'argumenta que aquestes mesures i indicadors han de passar del paradigma d'investigació al paradigma d'avaluació perquè puguin informar els programes de desenvolupament i millora docent actuals i futurs.

S'han de dissenyar programes en l'etapa de planificació per construir una base d'evidència que permeti a investigadors i professionals fer preguntes més complexes sobre on i sobre qui tenen impacte els programes, i per què.

Paraules clau: programes de desenvolupament docent; avaluació i seguiment; impacte; avaluació de l'eficàcia; universitat.

Resumen. *La medición y el impacto de los programas de desarrollo de profesores universitarios*

Los programas de desarrollo de maestros han formado parte del panorama de la educación superior de habla inglesa durante más de cuarenta años. En la actualidad existe un acuerdo general sobre el impacto positivo que tienen los programas de desarrollo de profesores en los maestros y estudiantes; sin embargo, el alcance y la duración de su impacto en la cultura de la disciplina y las instituciones están más bien poco documentados y evidenciados. Existe una clara necesidad de una investigación rigurosa sobre el impacto de los programas de desarrollo de los maestros, que se ve más profundamente y más allá de los profesores que participan en los programas. El objetivo de este trabajo es hacer uso de la investigación y la literatura inglesa para identificar el impacto y la eficacia de los programas y actividades de desarrollo de maestros y proponer un marco para la medición sistemática y la recopilación de información sobre la eficacia de estos programas. Se argumenta que estas medidas e indicadores tienen que pasar del paradigma de investigación al paradigma de evaluación para que puedan informar a los programas de desarrollo y mejora docente actuales y futuros. Deben diseñarse programas en la etapa de planificación para construir una base de evidencia que permita a investigadores y profesionales hacer preguntas más complejas sobre dónde y sobre quién tienen impacto los programas y por qué.

Palabras clave: programas de desarrollo docente; evaluación y seguimiento; impacto; medición de la eficacia; universidad.

Summary

Introduction

Teacher development programs and activities to enhance teaching and learning have been a feature of many higher education institutions, particularly throughout the English speaking countries, for more than 40 years. During this time, there have been significant changes in the teaching environment in universities. Pedagogical understanding has developed, technology has provided unprecedented opportunities of access and enrichment, academic staff have engaged in dialogue and reflections on their teaching, and ethnic and cultural diversity of students has demanded new understandings and skills of academic staff. More recently, a growing awareness that university stu-

dents of the 21st century expect different educational experiences than was typically provided by universities 40 years ago has motivated higher education institutions to take action to raise the quality of teaching and enhance the student learning experience (Knapper, 2003; Hanbury et al., 2008).

The government in Australia, in common with other countries, has been focusing on an agenda of quality, value for money and enhanced participation for higher education, resulting in persistent attention on quality assurance of higher education for over two decades (Chalmers, 2007, 2008; Ramsden, 2003; Bradley et al., 2008). This attention has not only focused on policy and practice at the sector and institutional level, but also on teaching practices, the gulf between research and teaching quality in universities and the changing background and expectations of students (Clark et al., 2002; Norton et al., 2013). In response, many Australian universities now require academic staff new to teaching to undertake an initial teacher preparation program in the first years of their appointment and encourage their staff to regularly participate in professional development related to teaching through offering an extensive range of programs. Similarly, universities in countries such as Sweden, Norway, United Kingdom, Malaysia and Sri Lanka have made pedagogical training of university teachers compulsory as one step towards assuring the quality of teaching (Gibbs & Coffey, 2004; Roxå & Mårtensson, 2008; Parsons et al., 2012). With greater attention being paid to the quality of teaching in universities more broadly, and in individual performance reviews and promotion more specifically, there are clear expectations that teaching staff will increasingly be required to provide evidence of the quality of their teaching and of ongoing participation in teacher development programs. This in turn leads to questions on the effectiveness of professional development programs and calls for educational development centres to demonstrate that their programs are not only linked with their university's strategic initiatives, but that they have resulted in improved teaching practices and student learning experiences and outcomes (Brew, 2007).

This paper reports on an Australian project which developed an evaluation tool for teacher development programs. The central argument is that without a rigorously developed and relevant evaluation instrument, the effectiveness of teacher development programs will continue to be assessed through limited tools such as participant satisfaction surveys which do not provide evidence of the immediate and long-term impact of the programs on teaching, learning and the institutional culture related to teaching and learning. Ensuring rigour required a substantial review of the literature reporting studies which have attempted to measure the impact and effectiveness of programs in terms of teachers and teaching, student approaches to learning and institutional culture. Ensuring relevance required a thorough understanding of the programs to be evaluated. This was achieved through an audit of teacher development activities in the institutions for whom the assessment instrument was designed. The project was designed around an action research-based methodology con-

cerned with practical problem solving, expanding knowledge, enhancing the competencies of participants and delivering findings which are able to be applied immediately to the real world (Clarke, 2005).

1. Impact and effectiveness of teacher development programs

Until recently, the impact and outcomes of teacher development programs on enhancing teaching, student satisfaction and learning or the institutional climate that rewards and recognises teaching had been largely under researched (Devlin, 2008).

However, several recently published articles, reports and edited books have brought together the many small research and larger studies which provide a solid basis on which a number of very clear claims about the impact and effectiveness of teacher development programs can be made (e.g. Amundsen & Wilson, 2012; Chalmers et al., 2012; Parsons et al., 2012; Simon & Pleschova, 2013; Stes et al., 2010)

There are several models that have been proposed to review the effects and impact of teacher development programs (Kirkpatrick, 1998; Chism & Szabo, 1997; Guskey, 2002; Stes et al., 2010). Guskey's (2002) five-level model of teacher development largely reflects those used to review effects and identify where the impacts of development have taken place. The first level of Guskey's model is the teachers' reactions to the development program. The second level is identifying if there has been any conceptual change in teachers' thinking, their knowledge of teaching, their attitudes and motivations. Stes et al. (2010) further elaborated Guskey's level 2 to include: impacts on teacher attitudes (changes in attitudes towards teaching and learning); impacts on teaching conceptions (changes in ways of thinking about teaching and learning); impacts on teaching knowledge (acquisition of new or enhanced concepts, procedures and principles); and impacts on teaching skills (acquisition of thinking/problem solving, psychomotor and social skills). The third level is identifying if there are changes in the organisational culture, practices and support. The fourth level is identifying if there have been any behavioural changes in the way teachers use the newly acquired knowledge, skills and techniques in their teaching practices. Other models re-arrange level 3 and 4, so that the participant effects can be grouped together (Stes et al., 2007). The fifth level is identifying if there are changes in student learning. Other elaborations for this fifth level have emphasised changes in student engagement, perception, study approaches and responses to the teaching, rather than student learning, as it is difficult to attribute changes in student learning outcomes as a result of teacher development programs (e.g. Gibbs & Coffey, 2004; Stes & Van Petegem, 2013).

Each of these five levels will be reviewed to highlight the evidence that is available on the impact and effectiveness of teacher development programs.

1.1. Teachers' reactions to the development program

The 'happy sheet' that reports participant satisfaction at the end of the workshop or program remains the most common form of evaluation for the majority of teacher development programs (Ako Aotearoa, 2010). While some researchers have argued that this level should not be included or should not include satisfaction ratings (Weimer & Lenze, 1998), others argue that it is a legitimate effect to report (Kreber & Brook, 2001; Kirkpatrick, 1998), particularly as it mirrors the use of student satisfaction ratings by teachers as a proxy indicator of quality teaching. Studies consistently show that teacher development programs are typically well received, with the participants reporting overall satisfaction with the programs they have attended (Rust, 1998; Postareff et al., 2007), with evidence of positive changes in attitudes towards teaching development programs (Steinert et al., 2006). Unsurprisingly, teacher development programs that are voluntary tend to be rated more highly than compulsory programs (Chng & Swee Kit, 2013).

1.2. Conceptual changes in teachers' thinking

Several studies have been carried out on the impact of teacher development programs on teacher attitudes - changes in attitudes towards teaching and learning (Hanbury et al., 2008), teaching conceptions - changes in ways of thinking about teaching and learning (Ho et al., 2001; Postaraff et al., 2007; Åkerlind, 2007; Prebble et al., 2004; Prosser et al., 2006); teaching knowledge - acquisition of new or enhanced concepts, procedures and principles (Åkerlind, 2007; Postareff & Lindblom-Ylänne, 2008) and teaching skills - acquisition of thinking/problem solving, psychomotor and social skills.

While the majority of these studies have identified positive changes in teacher attitudes and beliefs, there is complexity linked to the characteristics and beliefs that the individuals bring to the training context. The initial conceptions and beliefs teachers hold about teaching may influence potential learning from teacher development programs. For example, teacher development programs may be considered irrelevant if teachers hold beliefs that teachers are born, not made (Norton et al., 2013; Knapper, 2013). Similarly, the disciplinary culture, and low confidence and self-efficacy can hinder changes in conceptions and beliefs about teaching (Postareff & Lindblom-Ylänne, 2008).

In a large multi-national study of formal teacher training programs, Gibbs and Coffey (2004) found that teachers became more student-centred after a sustained training process. Similar conclusions were reached by Postareff, Lindblom-Ylänne, and Nevgi (2007), finding that intensive pedagogical training is needed before positive changes to approaches to teaching may be expected to emerge.

Research has shown that all teachers hold personal conceptions of teaching which are the result of their own experiences, both as students and teachers (Samuelowicz & Bain, 2001). Their conceptions range from those who hold

a teacher-focused and content-oriented transmission model of teaching (Entwistle & Walker, 2000), to those who place the student at the centre of decisions related to teaching and learning and see teaching as synonymous with the facilitation of student learning and conceptual understanding (Kember & Kwan, 2000).

A number of studies have investigated the impact of teacher development programs on conceptions of teaching (Van Rossum & Schenk, 1984; Trigwell & Prosser, 1997). Some studies have claimed to change participants' conceptions of teaching by increasing their awareness of the existence of other conceptions which are more conducive to student learning (Samuelowicz & Bain, 2001) while others have used action research (Kember & Kwan, 2000). Conceptions of teaching were changed in a study by Ho, Watkins and Kelly (2001) through involving participants in a four-stage process of self-awareness, confrontation, exposure to alternative conceptions and finally, commitment to new understandings.

Other studies have examined the way in which teachers develop their conceptions of teaching through experience (Åkerlind, 2007), strategic alertness (Trigwell & Prosser, 1997) or over time as they move to more sophisticated conceptions in a 'nested hierarchy' (Entwistle & Walker, 2000). Teacher development programs which focused on conceptual change were found to be effective in shifting teachers' beliefs from teacher-centred to student-focused (Ginns et al., 2008), which offers the potential to shift teacher behaviour and student learning.

1.3. Behavioural changes in the way teachers use the knowledge, skills and techniques they have learned in their teaching practices

There is a large body of work concerned with the influence of teachers' pedagogical beliefs on their teaching practices. It was previously assumed that teachers' conceptions of teaching would be reflected in their teaching practices. For example, teachers who held teacher-centred conceptions would employ more didactic teaching practices and teachers who held student-centred conceptions would utilise active learning strategies with their students. However, Samuelowicz and Bain (2001) identified a gap between teacher's stated beliefs and actual teaching practices. More recently, Stes and Van Petegem (2011) confirmed that early career teachers who changed their thinking towards being more student centred, did not automatically make changes in their teaching practice in line with their changed thinking. The importance of this gap is significant as it has been found that teachers' beliefs and approaches to teaching have a direct impact upon student learning approaches (Prosser & Trigwell, 1999).

It was also assumed that with practice and increasing experience, teachers would move progressively from a teacher-centred conception towards a more student-centred conception. Norton et al. (2013) found that experience appeared to make little or no difference to the beliefs or conceptions held by

university teachers. This finding was confirmed in a review by Richardson (2005) who found very little evidence that teachers' conceptions of teaching developed with increasing teaching experience, or as a result of formal training. Owens (2012), however, found experience was a factor for teachers developing a more student-focused approach, with teachers who had more than six years' experience likely to take a student-centred approach to their teaching. A stronger relationship in developing more student-centred practice with experience was found if combined with a teaching qualification and ongoing specific teacher development.

The picture is not as bleak as the above studies paint. Ho, Watkins, and Kelly (2001) showed that a change towards more sophisticated forms of teaching is possible if conceptions of teaching are addressed at the beginning of formal training. This has been confirmed in subsequent studies where teachers who changed their conceptions demonstrated gains in their teaching practices compared to teachers who did not make conceptual changes (Steinert et al., 2006). As changes in teaching practices cannot be assumed, teachers in training programs need to be provided practical guidance and support on ways to implement the different aspects of student-centred teaching into their daily teaching practices if they are to adopt practices that better match their changed conceptions. Owen's research confirms the importance of combining general pedagogical training with practical guidance and examples. Owens found that when specific training in the use of online learning environments was provided to university teachers who held teaching qualifications, they were significantly more likely to use these environments in an effective way to engage students. In contrast, teachers who had participated in general teacher training programs and/or held student focused beliefs, but did not receive specific training in the use of online environment, did not use the technology effectively to engage their students (Owens, 2012).

A number of studies have concluded that teachers with teaching qualifications receive higher student ratings than those who do not have such qualifications (Rust, 2000; Breda et al., 2003; Cilliers & Herman, 2010; Weurlandeer & Stenfors-Hayes, 2008). The higher ratings have been related to improved teaching practices. Donnelly (2006) reported that the three main effects on teacher behaviour following participation in an academic development program were the development of new instructional strategies, the implementation of new teaching approaches, and the change in beliefs about teaching and learning theories (p. 214). Similarly it has been reported that following participation in teacher development programs, academics display greater confidence in using new techniques (Hanbury et al., 2008), a better understanding of the student perspective (Knight, 2006) and are more likely to engage in the scholarship of teaching and learning (Healey, 2000).

Studies on the effectiveness of discipline-specific versus generic teacher preparation programs in changing teacher behaviour have concluded that generic teacher preparation programs have less influence on teacher behaviour than those which are discipline specific. When considered in light of the find-

ings that teachers in the 'hard disciplines' (physics, chemistry and mathematics) adopt more teacher focused approaches, while those in the 'soft disciplines' (history, art, philosophy) are more student focused (Lindblom-Ylanne et al., 2006), there is a need to consider the appropriateness of offering generic programs if a change in teacher behaviour is the desired outcome.

While it can be concluded that there is evidence that teacher development programs can lead to reports of teachers feeling more confident and less stressed about teaching, especially large classes, of having expanded repertoires of teaching strategies, and being more student-centred in their approaches to teaching, Kinchin (2005) cautions that the changes in practices may be quite superficial if they are not further encouraged and supported.

1.4. Changes in organisational culture, practices and support

The importance of the organisational culture, practices and support was recognised by Guskey as a critical input indicator, arguing that the "lack of organisational support can sabotage any professional development effort, even when the individual aspects of professional development are done right" (2002, p. 48). Its usefulness as an outcome indicator of impact of teacher development programs has been less recognised (Kreber & Brook, 2001; Trowler & Bamber, 2005). There is limited research which shows the impact of teacher training programs on organisational policy, culture, practices and support. This may be more of a consequence of the focus and purpose of the training program being largely targeted at the teachers and students. However, a number of teacher development programs are clearly organisationally orientated, designed to introduce new staff into the policies, processes and academic culture of the institution and to develop specific skills in line with institutional priorities. A growing number of universities encourage or require participation in teaching certificate courses viewing it as an investment in future staff and quality assurance (Chalmers et al., 2012; Butcher & Stoncel, 2012).

For many studies, organisational impact was not a direct focus of investigation. For example, Stes et al. (2007) identified that participants in a one-year teacher development course reported that they had become more involved in their department committees, in teaching and teaching policy, and remained active in the two years following the conclusion of the course. For these participants, a key facilitating factor for increased and/or ongoing innovations and organisational engagement was the positive reaction of colleagues and students to a teaching innovation, particularly if it involved working with colleagues who had also participated in the training course. Key negative factors identified as impediments to introducing student-focused teaching practices included large classes, pressures to research and publish, and lack of practical and policy support. The most frequently cited factor that participants felt most constrained the impact of the teacher development program was lack of consensus and collaboration with colleagues (Stes & Van Petegem, 2011).

A positive relationship between engaging in the scholarship of teaching, including graduate certificate courses that focused on scholarship of teaching, and positive student' course experience was identified by Brew (2007), who found a correlation between higher student satisfaction and higher department engagement in the University's Scholarship Index.

Institutional differences were found in attitudes to teacher development programs where participants in the more recently established universities in the UK, which tended to be more teaching than research focused, perceived the teacher development programs more positively than participants in the research-focused, older universities (Prosser et al., 2006). This variation of participant response related to different university contexts alerts evaluators of the need to design their evaluation within their local institutional context and to be cautious when interpreting comparative data (Bamber, 2008).

Accounting for the organisational impact of teacher development programs is important, but it is just as important to consider the impact organisational climate or culture has on teacher development programs (Cilliers & Herman, 2010; Hanbury et al., 2008; Toth & McKey, 2010; Weimer, 2007). The institutional culture or climate is associated with the notion of 'learning architecture' (Dill, 1999) or the policies and procedures within universities for accountability and improvement which might include processes for systematic review and benchmarking, and for dissemination of good practice in teaching and learning. Complementing this is the concept of 'enhancement culture' which supports the transfer of learning from teacher development programs and further innovation and experimentation. Trowler and Bamber (2005) explored the intersection of institutional policy and capacity and culture and highlight the gulf which exists between effecting change in individual teacher behaviour and achieving more widespread institutional change. Others (Gibbs & Coffey, 2004; Ginns et al., 2008; Southwell & Morgan, 2010; Cilliers & Herman, 2010) investigated barriers to the transfer of learning from teacher development programs, such as a lack of faculty/department support, lack of funding and resources, lack of interest from colleagues and resistance to change. A supportive organisational environment, on the other hand, is characterised by ample opportunities for professional development, recognition and reward of teaching achievements, funding to support initiatives aimed at improving teaching and an 'enabling environment' in which senior managers not only participate in communities of practice, but value professional development activities (Cilliers & Herman, 2010, p. 7).

1.5. Changes in student learning, engagement, perceptions, study approaches

Guskey's fifth level of evaluation and impact involves identifying if there are changes in student learning. Other elaborations for this fifth level have emphasised changes in student engagement, perception, study approaches and responses to the teaching rather than student learning, as it is difficult to attribute changes in student learning outcomes as a result of teacher develop-

ment programs (e.g. Gibbs & Coffey, 2004; Stes & Van Petegem, 2013). While Guskey (2002) argues that student learning outcomes can and should be identified and attributed to educational development, his model is situated in schools where teachers and students interact regularly over an extended period of time. However, in universities, students have limited direct engagement with their different teachers, and many different teachers and tutors may be contributing to the teaching of the one subject. Of these many teachers, perhaps only one teacher may have participated in a teaching development program. In this context, attributing student learning, or lack of learning, to participation in a teacher development program is problematic.

So while it could be argued that all teacher development programs have the underlying, if not explicit, goal of improving student learning and certainly the teacher development programs are frequently described as intending to facilitate improvement in the quality of teaching and learning (Eggins & Macdonald, 2003); nevertheless, the literature on the relationship between teacher development programs and student learning is not only scant, but at times confusing or contradictory. For example, some studies have concluded that there is little evidence regarding the impact of teacher development on teaching practice and even less evidence of impact on student learning (Weimer & Lenze, 1998). Others suggest a positive, albeit indirect, relationship (Gibbs & Coffey, 2004; Hanbury et al., 2008). Teacher development programs can influence student learning by assisting teachers to adopt teaching approaches which encourage deep learning and teachers, through encouraging a high level of student engagement in class have had a positive effect on student learning (Carini et al., 2006).

In summary, while the question on identifying the impact of teacher development programs seems to be a relatively straightforward one, there is considerable debate about how to determine the impact of teacher development programs or combinations of different teacher development programs and the indicators that can be used. Questions arise on what aspects to consider, what and how to measure them and how conclusive assertions of impact can be made. Furthermore, any consideration of the impact of teacher development programs can only be meaningful when contextualised against the size and type of institution, the resources available, the intended outcomes of the programs, and the organisational climate in which the teacher development programs take place. These all add to the complexity of the task of measuring effectiveness. For these reasons, single, limited term teacher development activities and programs are likely to have a less measurable impact on teachers, students or organisational culture, though these are typically the focus of research investigations of effectiveness and impact of teacher development.

It is argued that in order to identify and measure impact and effectiveness, the full range of teacher development programs and activities should be considered in aggregate, as well as separately, to determine their impact and effectiveness. Furthermore, it is argued that the evaluation tool should be informed by the evidence in the literature related to the aspects of these diverse programs

that can be measured; namely changes in teacher beliefs, knowledge and behaviour; student approaches to learning; and the institutional culture which supports teaching and learning.

2. Identifying indicators of impact and effectiveness systematically for diverse teacher development programs

A number of reports have documented the range and intended outcomes of various types of teacher development programs in Australia and overseas (Stefani, 2011; Ako Aotearoa, 2010; Hicks et al., 2010; Ling, 2009; Viskovic, 2009; Dearn et al., 2002; Kreber & Brook, 2001; Gibbs et al., 2000). These reports demonstrate that teacher development programs vary in scope, content, delivery mode, intended outcomes and audience. They can be formal or informal, short or extended, planned or unplanned. Teacher development activities may be centrally designed and delivered, be more decentralised including faculty/school or discipline activities, be offered through professional associations or occur through collaborative, peer or partnership arrangements or communities of practice.

Shorter courses and workshops tend to have a single intention such as providing orientation, disseminating information or instructing in particular skills. Short training courses tend to present discrete, skills-based topics. Longer, intensive, more formal programs tend to focus on building understanding and capacity in terms of pedagogical approaches appropriate to learners in higher education. Programs can be located in disciplines or departments, while others are designed to be interdisciplinary (Butcher & Stonecel, 2012; Donnelly, 2006). Many programs are designed to increase participation and engagement in communities of practice, mentoring, reflective practice and action learning, thus highlighting the significance of context for effectiveness of development programs (Warhurst, 2006; Peseta & Manathunga, 2007; Spronken-Smith & Harland, 2009; Ortlieb et al., 2010).

This diversity of programs and context described in the reports was confirmed in an audit of teacher development programs and activities provided by thirty-nine Australian universities (Chalmers et al, 2012), which identified that the range and types of programs varied considerably from formally accredited programs such as Graduate Certificates in Tertiary Teaching and Foundations of University Learning and Teaching programs for academics new to teaching, to less formal programs with incidental workshops run through a central unit or within faculties or departments. These might also include formal or informal peer review of teaching, and processes and practices that encourage both self-reflection and university wide networks and communities of practice. The programs, in their varied forms, are provided face-to-face, off-shore and on-line.

Such diversity of range, outcomes and context of teacher development programs presents a significant challenge to developing an evaluation tool which will facilitate universities and centres to identify the effectiveness and

impact of their programs, is adaptable to different contexts and activities, and does not compromise the depth and breadth of the range and diversity of the programs.

2.1. Different outcomes for teacher development programs

Drawing from the literature and audit of Australian university teacher development programs, the intended outcomes could be broadly categorised as teacher focused, learner focused or institutionally focused, although the relative emphasis varies between formal and informal programs. Formal programs had a strong focus on outcomes related to pedagogy in higher education with the underlying intention of changing teachers' conceptions of teaching, extending teacher knowledge and understandings about teaching and learning, and developing teaching behaviours and skills with the implicit goal of improving student learning experiences.

The majority of the informal programs had a single outcomes focus such as specific teaching skills or behaviours and had less emphasis on changing teachers' conceptions of teaching and understandings of pedagogy. This is not surprising given that the informal programs are of a much shorter duration. This presented the further challenge of identifying indicators which would be relevant to all institutions and the full range of their programs.

2.2. Types of quality indicators

Four types of quality indicators are commonly used in higher education: Input, Process, Output and Outcome. These can be more broadly categorised as Quantitative and Qualitative indicators. Quantitative indicators are based on numerical assessments of performance and are typified by Input and Output indicators. Qualitative indicators use non-numerical assessments of performance and include Process and Outcome indicators (Borden & Bottrill, 1994). See Chalmers (2008) for a review of quality indicators for teaching and learning. In summary,

— *Input indicators* refer to the human, physical and financial resources dedicated to particular programs;
— *Output indicators* refer to the results or outcomes of the programs which are measurable such as the number of program participants;
— *Process indicators* reveal how programs are delivered within the particular context referring to policies and practices related to learning and teaching, performance management and professional development of staff, quality of curriculum and the assessment of student learning, and quality of facilities, services and technology;
— *Outcome indicators* focus on the quality of provision, satisfaction levels and the value added from learning experiences.

Together, these types of indicators direct attention to both the effectiveness of the practices and processes involved, and the changes or effects which occur as a result of these practices and processes. Furthermore, they acknowledge that not all changes will be evident within the same time frame with some occurring in the short term and others only evident in the long term.

Despite the recent emphasis by governments and universities on output and outcome indicators, there is general agreement that the complementary use of input and process indicators is appropriate and useful for generating information related to teaching and learning in higher education. There is also recognition that the information generated needs to be interpreted and contextualised with data provided from a variety of sources since all types of indicators have some limitations. Collectively, the full range of indicators can provide a comprehensive picture of the quality of teaching and learning activities. For these reasons, indicators drawn from all of these four types were identified as necessary to include in the teacher development effectiveness framework.

3. A framework for identifying effectiveness and impact of teacher development programs

A national strategic priority project was commissioned by the Office of Learning and Teaching in Australia in 2011 to develop a framework that would allow universities and Centres of Teaching and Learning to systematically identify the effectiveness and impact of teacher development programs (Chalmers et al., 2012).

The Teacher Development Effectiveness Framework is an evaluation framework designed to assist academic and educational developers to gather evidence of the effectiveness of their teaching and learning programs for academics in higher education. It is based on the notion that an intervention such as a teacher development program will result in change in knowledge and practice appropriate to the teaching-learning context. In evaluating the success of such teaching development programs, two aspects require attention: the effectiveness of the practices and processes involved, and the changes or impact which occur/s as a result of these practices and processes. Evidence of effectiveness requires looking beyond the delivery of the program to policies, institutional culture, teacher knowledge and practice, student learning behaviour and to data which demonstrates sustained and sustainable improvement.

The conceptualisation and development of the Effectiveness Framework was underpinned by four key principles:

1. Relevance: The Framework should be relevant to the range of type and purpose of teaching preparation programs;
2. Rigour: The Framework should be founded on a theoretical and evidence-based model;

3. Context: The Framework should take account of contextual factors, including learning architectures and enhancement cultures; and
4. Reliability: The Framework should be trialled in a range of universities. The structure and content of the Framework is shown in Figure 1.

The Framework is a matrix of indicators related to the intended outcomes of formal and informal teaching preparation programs and the institutional context within which these occur. (While two separate Frameworks were developed to take account of the different intended outcomes of formal and informal programs, they share a common structure.)

— Category of TPP (Teaching Preparation Program): These are either formal (accredited, comprehensive and extended in duration) or informal, (short with a single focus). There are separate Frameworks for Formal and Informal programs as their intended outcomes vary considerably.
— Two Levels: The Framework facilitates the collection of evidence related to teaching preparation programs and the institutional context within which these occur. As these are quite different in nature, they are presented as separate sections within the Framework.
— Outcomes focus: These categories reflect the main themes of the outcomes which were identified in the audit of the teaching preparation programs in Australian universities.
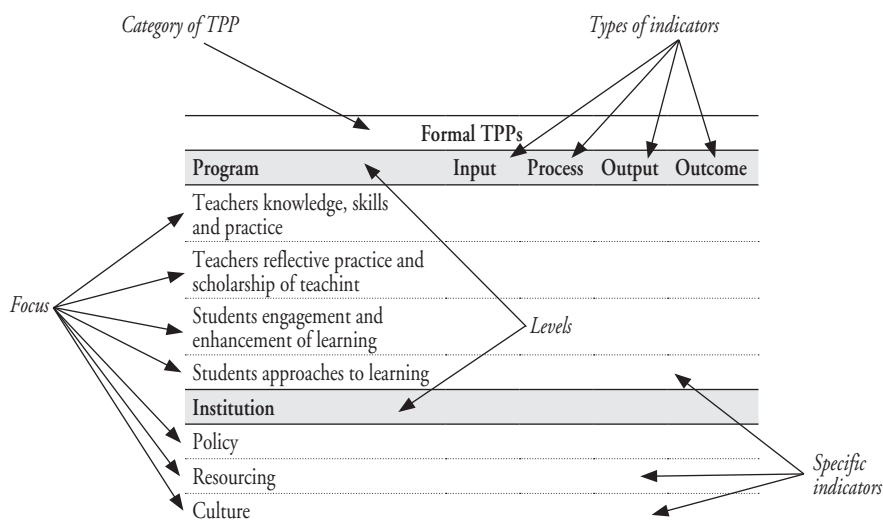

Figure 1. Structure of the Academic Professional Development Effectiveness Framework.
Source: Chalmers et al. (2012).

— Types of indicators: The four types of indicators support the collection of both qualitative and quantitative data and short and long term evidence.
— Effectiveness indicators: These have been developed on the basis of evidence in the literature and together form a collection from which academic developers can choose those relevant to their particular context.

Each of the cells in the Framework was populated with specific indicators based on the literature review and audit. The specific indicators provide indicative examples from which centres for teaching and learning can choose, depending on which particular program/s they are interested in evaluating or which particular outcomes of program/s are of interest or concern. Furthermore, the indicators provide guidelines for program development by operating as a checklist of desirable outcomes. The Framework can also be manipulated to be used as repository for evidence gathered in relation to the indicators. The detailed version of the Frameworks can be found on the project website (Chalmers et al., 2012).

A number of universities in Australia have trialled the Framework and reported their experiences. Their use of the Framework varied from using it to assist them in reviewing as well as planning their programs, to clarify the focus and purpose of their various programs and then to systematically collect data from a range of sources over a period of time to allow them to monitor and subsequently enhance their programs. Examples of different ways the Framework has been used in Australian universities can be found on the project website (Chalmers et al., 2012).

More recently, interest in Chile on the evaluation of teacher development programs provided the opportunity to trial the Framework's applicability in a different cultural context. Several of the programs offered by the Centro de Desarrollo e Innovacion de la Docencia (CEDID) at the Universidad Catolica de Temuco identified the intended outcomes for each of their teacher development programs and evaluation indicators for each of these were identified. An example of the Evaluation Framework in use for the Learning Assistants' Development program is shown in Table 1.

The use of the Framework facilitated the Centres' capacity to evaluate the effectiveness of individual teacher development programs, but more importantly, to identify the combined impact across all of Guskey's five levels of teacher development programs that are provided in universities. Table 2 demonstrates this where the indicative indicators, drawn from the individual Evaluation Frameworks for each teacher development program can demonstrate separately and in aggregate, their intended impact and effectiveness across each of Guskey's five levels.

Table 1. Learning Assistant Program, Universidad Católica de Temuco, Centro de Desarrollo e Innovación de la Docencia (CEDID), Evaluation Framework with Input, Process, Output and Outcome indicators

Colegio de Ayudantes	Input	Process	Output	Outcome
Intended outcomes	Previous program, funding.	LA policies LA database to track LAs Review of LA program (4 year overview)	Number of trained LAs (188 in previous program)	Annual reports 2010, 2011, 2012, 2013 > Review report 2014 Reports to Program Directors Publication of the LA program and its evaluation in journal, reports External recognition of program through invitations, visits.
Planning and evaluation	New plan, funding			
Training of LAs	Number of designated LAs Number of certified LAs	LA training modules Basic (2013), Advanced (2014) LA portfolios (including journal/recording of teaching activities Establish learning community of LAs (2015) Sample observation of LAs use of targeted teaching initiatives/technology(2014)	Attendance per module Number completed Reported Service Learning (2015) Retention, completion, grades of LAs in own courses Number of trained Science LAs Number/proportion of trained indigenous students	LA Practice inventory, ATI (Pre/Post) (2014) Frequency and use for educational technology in classes (2014) LA satisfaction with modules (2014) LAs Overall satisfaction with program (2015) LAs portfolio assessment and outcomes

Colegio de Ayudantes	Input	Process	Output	Outcome
Teacher/ing support	Number of teachers with LAs / Proportion of teachers with LAs with total teacher population	Activities undertaken by LAs in classes with teacher (2014) / Articulation of LA program with other CEDID programs	Number of students in classes with LAs / Number of Science teachers with trained LAs (trend over time)	Teacher satisfaction with LAs / Teacher reported changes in practice (ATI) pre/post (2015) / Number of requests for LAs / LA Good practice resources
Student impact/ engagement	Number of students with trained LA / Proportion of students with LAs in total student population	Audit of teaching and learning activities in classes with LAs using ATI (2015) / Comparison audit sample of teaching activity of those without (also linked to ATI) (2014-15)	Retention rates, passing grades of students with LAs compared to retention, grade without (by discipline, year)	Satisfaction of students with LAs (student survey) / Comparison of satisfaction with LAs compared to satisfaction without (by discipline, Year) (2015)
Climate and support for LAs in schools, university	Number of requests for LAs by teachers, program directors/ tracked over time	LA Teachers actively involved in training (2015) / Teachers promote training for LAs development. (2015) / Invitations to present on program to schools, university forums.	Number of LA teachers who attend training programs/ participate in CEDID programs/activities, / Number of training programs attended by LA teachers (2015) / Number of trained LAs in UCT Teaching Grants projects	Satisfaction of LAs Teachers with LA program

Source: Chalmers (2013).

Table 2. Example from Universidad Católica de Temuco, Centro de Desarrollo e Innovación de la Docencia (CEDID), mapping the Indicators collected by the Centre for its key teacher development programs of impact and effectiveness against Guskey's five levels

Impact category	CEDID	Learning Assistants (LA)	Technology and teaching	Faculty development & learning communities
1. Teacher reaction	Program and aggregated satisfaction ratings from common CEDID survey/ questions	LA satisfaction ratings with training Teacher satisfaction with trained LAs and program	Teacher satisfaction ratings with workshops Teacher satisfaction with blended learning module	Teacher satisfaction ratings with workshops Teacher satisfaction ratings with modules
2. Teacher thinking	Number and range of programs offered on knowledge, skills, strategies Range of programs and activities mapped to the teacher excellence competencies Number of programs involving national/ international experts	Number of teachers with trained LAs, Trend over time Number of Science teachers with LAs (trend over time) Number of Science teachers with trained LAs Number of trained Science LAs Number of indigenous students trained as LAs	Number at workshops Number taking modules Number of Basic Science teachers at workshops and taking modules	Number and range of programs, resources offered on teacher knowledge, skills, strategies – mapped to teacher excellence competencies Numbers engaged in each learning community Duration and sustainability of learning communities (faculty groups/learning communities)
a. attitudes	Numbers attended, participation (trend)	Approaches to Teaching Inventory (ATI) Attendance per module	Number who take additional/ advanced workshops Attitude to technology survey (Crumley) pre/post	Number at workshops Number completing modules Number of autonomous learning communities

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Impact category	CEDID	Learning Assistants (LA)	Technology and teaching	Faculty development & learning communities
b. conceptions	Periodic use of ATI for Master's and extended programs	Approaches to Teaching Inventory (ATI)		Periodic use of Approaches to Teaching Inventory (ATI) for extended programs
c. knowledge	Number of teachers enrolled and completing Master's modules and program	LAs successful completion of modules, classes, assessment tasks LA portfolios and assessment of outcomes	Survey question for teachers on their knowledge acquisition	Development and completion of modules Number of teachers with teaching qualifications
d. skills		Teacher reporting/ observation of expanded use of teaching skills	Teacher Self report confidence in skills to use technology Science teacher self report confidence in use of technology	
3. Teacher practices	Peer observation resources developed Summary of academic development undertaken (reported in Academic Annual review) Summary of teaching initiatives undertaken (reported in Academic Annual review)	Number LAs completed, certified LA practice reported in portfolio Publication of good LA practices (Repository)	Number of Moodle courses, (trend increase over time) Number of Science units with blended learning (trend) Audit of teacher use of technology using system analytics (basic-advanced) Teacher reported use of technology (from Annual Review reporting and sourced from Technology groups) Publication/promotion of good practices	Number and type of workshops/resources on teacher knowledge, skills Number participating, proportion of teachers participating in learning communities Reported outcomes of learning communities Publication/ promotion of good practices Reporting of learning community outcomes

Impact category	CEDID	Learning Assistants (LA)	Technology and teaching	Faculty development & learning communities
4. **Organisational change**	University policy on professional development UCT allocated adequate resources to professional development of teachers Annual reports on activity reported to University Number and type of programs offered on staff orientation, university policy, supporting university initiatives CEDID contribution on committees, reports. Engagement in schools in formal roles	Policy development and formal approval. LA program embedded in all schools. Ongoing UCT support for LA program Internal/External recognition/esteem of LA program Publication of program outcomes	Number of blended learning tutors (invited and accepted) Policy on e-learning use and future Institutional funding/support for use of technology Expansion of e-learning systems and tools Installation and use of resources in rooms and campuses (trend)	Heads of Schools encourage staff to participate in CEDID programs Engagement in institutional programs, funded projects, peer mentoring etc. is recognised in staff workload. Number of workshops offered in schools, invited to discuss, present in teaching. Inclusion in school, faculty meetings, discussions

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Impact category	CEDID	Learning Assistants (LA)	Technology and teaching	Faculty development & learning communities
5. Student learning	Type and number of programs with focus on developing student learning, engagement, attitudes	Monitoring LAs completion of study compared to matched non-LA students. Grades of students in LA supported classes Grades of trained LAs in ongoing study Number of Indigenous LAs trained (trend)	Training and resources focus on role of technology in student learning	Number of programs with focus on student learning, assessment, engagement Numbers/proportion of teachers attending Teacher perception of improved learning of their students
a. Engagement	Monitoring of student enrolment, retention and completion (by program of study) to inform programs Monitoring of indigenous student enrolment, retention and completion (by program of study – particularly science) to inform programs	Retention, progression rates of students in LA supported classes Number of trained LAs included in Teaching Grant programs	Student use of systems, tools – use systems analytics Student satisfaction with blended learning courses	Student attendance and retention in classes with trained teachers of extended programs
b. Satisfaction/ response	Monitor student satisfaction rates (1st year, all) Student satisfaction rates aggregated and trend reports	Student satisfaction of courses with LAs compared to those without.	Student satisfaction related to use of technology 1st year student satisfaction rates rated to use of technology Science student satisfaction rates	Student satisfaction rates reviewed to inform programs Learning communities student satisfaction rates

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Impact category	CEDID	Learning Assistants (LA)	Technology and teaching	Faculty development & learning communities
CEDID organisational effectiveness	Periodic review of all offerings and programs undertaken Benchmarking with national and international units Alignment of CEDID's strategic plan with university plans and priorities Linkage of activities and programs to UCT teacher excellence competencies Number and activities of international visitors organised by CEDID Publication and dissemination of CEDID work and programs	Annual reports on LA activities and outcomes Quality of training modules, peer reviewed Publication of reports, program External recognition, visitors, adoption of the program by other Chilean universities	Annual report on activities, programs, engagement of teachers and students, showing trends Activities related to national/international visitors, teachers	Number of teachers with a teaching qualification Linkage of activities and programs to UCT teacher excellence competencies Annual reporting of activities, teacher engagement with training and modules Annual reporting of outcomes and activities of learning communities Activities of international visitors

Source: Chalmers (2013).

    Through mapping the different types of indicators into the different categories of impact, as illustrated in Table 2, both the Centre and University have established a clear picture of intended impact of their teacher development programs and have identified the relevant data that needs to be systematically collected.

    The Framework has now been successfully used by universities in Australia and Chile to identify the impact and effectiveness of their teacher development programs. Reviews of the programs using the evaluation data can inform the enhancement and development of future programs. In addition, it has been shown that carrying out systematic evaluation contributes to improved relationships between participants and the program teaching teams, as well as with the university leadership and the Centre. The power of systematically carrying out evaluations should not be underestimated, for even if data are not overwhelmingly significant, both learning and credibility can be gained (Bamber, 2008).

4. Conclusion

This paper has drawn on the English research and literature to identify the impact and effectiveness of teacher development programs and activities and then outlined an evaluation framework that can be used for the systematic measurement and collection of information on the effectiveness of these programs. It has argued that these measures and indicators need to move from the research paradigm to the evaluation paradigm so that they can inform ongoing and future teacher development programs and enhancement. Examples demonstrating how these can be used to do this have been provided. Programs that collect evidence and indicators from the planning stage will build an evidence base that will enable researchers and practitioners alike to demonstrate the impact of teacher development programs and ask more complex questions on where and on whom the programs have an impact, and why they have impact.

Acknowledgements

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