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## Knowledgeable Learning and Conceptual Change: Value Adding to Teacher Training

Tony Yeigh  
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*Abstract: This report concerns the use of pre and post responses to an online questionnaire as evidence of knowledgeable learning by education students at a regional Australian university. Factor analysis was used to reveal conceptual changes in the students' thinking about classroom management across a unit of learning they had undertaken. These changes primarily involved movement from an authoritarian, rule-based management approach, toward a more differentiated, inclusive approach to management. The implications these changes have for unit delivery, as well as for validation of the engagement process, are discussed, and recommendations made concerning ongoing research and the design of online learning.*

### Introduction

Gibbons, Limoges, Nowotny, Schwartzman, Scott, et al., (2004) refer to the “massification of education” (the large scale dissemination of high quality education across societies) as one of the key elements contributing to the worldwide commercialisation of knowledge (cf. Benjamin, 2003; Coaldrake & Steadman, 1999). Within this context a “commercialisation imperative” (Hearn, Stuart, & Ordonez, 2004) has occurred in Australian universities over the last couple of decades, progressively compelling them to identify how ideas change in relation to different forms of teaching and learning (Carr, 2011; Dawkins, 1987; Everett & Entekin, 1994; DEST, 2002).

In this respect, and as tertiary education has turned more and more to the delivery of learning via online formats, widespread support has been given to the notion that online learning is just as effective as more traditional, face-to-face forms of learning (cf. Bernard et al., 2004; Sitzmann, Kraiger, Stewart, & Wisher, 2006). Consequently, the need to develop outcomes-based measures of *knowledgeable learning* (the learning that takes place in online learning environments) has also increased, as we seek to better understand the impact online learning may be having on the development of students' ideas and thinking.

Outcomes-based measures include the changes in attitudes, beliefs, and concepts that occur in relation to the learning undertaken for a unit of work or a university degree (Sheehan & Duprey, 1999). In this respect, the evaluation being reported here used online questionnaire items that represented core items of interest for a unit of learning, to provide feedback concerning the sorts of conceptual changes that had occurred in relation to that unit. These items were used to help evaluate the conceptual learning in the unit, in addition to the normal instruments used to evaluate university teaching.

Alavi, Yoo and Vogel (1997) posit the use of online learning and feedback mechanisms related to the learning of a unit or degree as a type of ‘value-adding’ process, by which knowledgeable learning is made more transparent and effective. According to Bates (2005), students are willing to engage with this sort of value-adding, especially when it involves the use of fast and accessible technology. From this perspective, Swars and Dooley

(2010) propose that systematic and intentional online connectivity between university programs and student teachers is important for integrating theory and practice in a manner that adds value to student learning outcomes.

A suggestion has also been made that online methods for value-adding are often more relevant for students due to their non-spatial/non-temporal accessibility (Lingenfelter, 2012). Studies concerning the accessibility of online learning indicate that students develop a deeper understanding of subject matter when they are able to use technology to both interact with, and then reflect on the learning materials (Bruff, Dean & Nolan, 2005; Seldin, 1989). We suggest that deeper learning occurs in this way because technology allows students to repurpose the learning, thereby promoting the development of a more individualised, more meaningful learning experience.

Nettle (1998) emphasises the need to relate teacher education courses more specifically to the professional development of students, including a clear imperative to establish relevant information concerning the outcomes of teacher education. In an approach similar to that used here, Nettle developed a survey to measure student teachers beliefs about teaching before and after a period of practice teaching was conducted.

His findings suggest that the use of pre- and post-instructional comparisons can deliver relevant feedback concerning the conceptual growth of students, providing the feedback highlights areas of knowledge where change seems to occur, areas where clarity does not seem apparent, and associations between student belief patterns and the core subject outcomes. Ball (2009) suggests that providing relevant feedback also contributes to teacher training for the students, as the ideas and concepts become internalised and are then carried over into professional practice.

## **Knowledgeable Learning and Core Unit Concepts**

This paper describes student feedback on a unit of work focussing on behavioural classroom management, delivered by the Faculty of Education at a rural Australian university. The objectives for this unit are based on the notion of 'Constructive Discipline', a proactive management approach that seeks to establish positive interconnectedness between students and the school (see Mayer, 1999; 2001).

These objectives also incorporate the principles and strategies involved in Sugai and Tobin's School-Wide Positive Behaviour Support (SWPBS) management approach (a holistic management approach that seeks to develop systematic, student-centred, and data-driven management practices, cf. Tobin, 2001), as well as corresponding to the principles of best practice as developed by the MCEETYA *Student Behaviour Management Project* (cf. De Jong, 2005).

Overall, the main learning objectives of the unit are for students to:

- understand the underlying function of a challenging behaviour, from the student's perspective, as providing the basis for effective management design;
- develop clear behavioural analysis skills (for example ABC analysis and Problem Path Analysis) in order to delineate the relative impact of proximal and distal influences on the challenging behaviour;
- use appropriate assessments tools (for example Curriculum-Based Assessment and sociometric evaluation) to differentiate the teaching/learning process and address skill deficits that may be associated with the challenging behaviour; and
- design student and group-specific interventions in the form of an *Individual Education Plan* (IEP), *Individual Learning Plan* (ILP), or *Behaviour Intervention Plan* (BIP), in order to manage behaviours from a duty of care perspective.

This unit is delivered in flexible mode, including both internal face-to-face instruction and external online instruction, and utilises a variety of online engagement activities (lectures, tutorials, and assessment items), and online resources (readings, multimedia presentations, and interactive exercises) to promote flexible learning.

Vonderwell (2003) attests to the efficacy of flexible online delivery, and Tallent-Runnels, Thomas and Lan (2006) suggest that university students who engage flexibly with online materials perform equally as well as those who learn via an internal, face-to-face mode of engagement. In light of this, it is expected that questionnaire data gathered from both students undertaking the classroom management unit internally and those engaging with it flexibly will be valid and relevant, and that the information gathered will provide useful insights and understandings for ongoing unit development, for benchmarking and other feedback to the Faculty, and for use by the students themselves as reflective materials by which they may further develop their own value-added learning.

Using a questionnaire instrument to help students focus and reflect on what they have learned in the unit of work is considered an important aspect of adding value to their overall learning. As with most university units, it is the successful learning of students that forms the basis for authentic evaluation and for the current analysis.

### **The Behavioural Causes Questionnaire**

After ethics approval had been obtained, the *Behavioural Causes Questionnaire* (BCQ, see Appendix A) was administered to 160 fourth-year education students, who were undertaking a unit on behavioural approaches to classroom management as part of their training to be secondary teachers. The BCQ is a 45-item questionnaire, using Likert-scale responses by which students:

- 1) Rate the significance of a variety of factors viewed as causing inappropriate behaviour in schools.
- 2) Rate the effectiveness of a variety of strategies for managing inappropriate behaviour in schools.

This questionnaire was made available online for the behavioural classroom management unit at two different points in the learning period: Once at the beginning of the period (the BCQ\_1, prior to Week 1), and once at the end of the period (the BCQ\_2, in Week 12), with the content remaining the same in both instances. This allowed the author to gather pre- and post-unit responses to the questionnaire items, in order to gauge any changes that might have occurred.

Ninety-eight students responded to the BCQ\_1, and seventy-two of them also responded to the BCQ\_2. Participation was entirely voluntary, and all student information was de-identified prior to analysis.

### **Questionnaire Categories**

The BCQ contains 45 items, grouped into five categories: *Family Environment Factors* (8 items), *Student Factors* (9), *Teacher Factors* (7), *School Factors* (6), and *Effective Approaches* (15). Items relating to *Family Environment Factors* are designed to elicit information concerning the perceived influence of family context, family relationships, and parenting style on misbehaviour at school. *Student Factors* items target information relating to the perceived influence of student personality, cognitions, ability, attitude, and behaviours. *Teacher Factors* items are aimed at beliefs concerning how teachers' attitudes, behaviours, management practices, and instructional strategies influence misbehaviours at school.

Similarly, *School Factors* items tap into perceptions concerning the school’s SES context, disciplinary system, social relationships, and class sizes as causes of student misbehaviour. The items in *Effective Approaches* seek information concerning the perceived effectiveness of specific management strategies for managing student misbehaviour.

### Reliability Analyses

Table 1 presents an overview of the reliability analyses (using Cronbach’s Alpha) for each category of the questionnaire items, in relation to both the pre- and post-unit applications of the questionnaire. Overall coefficients are also given, as an indication of generalised response consistency for the questionnaire.

Cohen (1988) categorises coefficient associations as weak (.2), moderate (.5), or strong (.8), but he also advises that these guidelines are to be judged only in relation to the circumstances of a particular study. The BCQ is considered valid within the current context because it displays generally moderate reliability, with all items corresponding to the content, goals and objectives of the management unit.

Questionnaire Category	Pre-Unit	Post-Unit	Overall
Family Environment Factors	.78	.65	.65
Student Factors	.57	.67	.46
Teacher Factors	.81	.73	.72
School Factors	.66	.47	.45
Effective Approaches	.77	.75	.71

**Table 1: Overview of reliability analyses for the BCQ categories**

### Questionnaire Rating System

The rating system asked students to respond to each questionnaire item in the first four categories by indicating how significant or influential they felt the item to be as a cause of student misbehaviours at school. The range of possible responses to each item for these categories used the following definitions and values:

- 1) Not Significant
- 2) Somewhat Significant
- 3) Moderately Significant
- 4) Quite Significant
- 5) Highly Significant

Responses to each item included in the *Effective Approaches* category used these definitions and values:

- 1) Not Effective
- 2) Somewhat Effective
- 3) Moderately Effective
- 4) Quite Effective
- 5) Highly Effective

## Factor Analysis of the Response Items

Factor analysis of the pre- and post-questionnaire responses was performed for two reasons: (1) to gauge how the structure of the responses corresponded to the questionnaire categories, and (2) to indicate whether or not significant change had occurred between the two administrations of the questionnaire. Factor analysis was performed using Principle Components Analysis, with varimax rotation and Kaiser normalisation. Table 2 provides an overview of the tests for sampling adequacy (KMO) and sphericity (Bartlett's), for each analysis performed.

It is noted that some researchers aspire to a minimum factor loading of .70 to confirm factor validity, but it is often difficult to achieve this level when performing research in the social sciences (Russell, 2002). In this respect Comrey and Lee (1992, cited in Tabachnick & Fidell, 2007), suggest .70 as 'excellent' yet also include .60 as 'very good', .55 as 'good', and .45 as 'fair'. Factor analysis was included for all variables here in order to explore patterns of student responses in relation to the BCQ, and in order to discern possible connections between the identified factors and knowledgeable learning. This is not intended to imply that all factors provide causal meaning to the learning. Rather that they present possible insights into conceptual change.

Questionnaire Category	Pre-KMO	Post-KMO	Pre-Bartlett's	Post-Bartlett's
Family Environment Factors	.78	.68	$X^2 = 175.3 (.001)$	$X^2 = 77.3 (.001)$
Student Factors	.54	.69	$X^2 = 122.8 (.001)$	$X^2 = 94.1 (.001)$
Teacher Factors	.81	.76	$X^2 = 200.8 (.001)$	$X^2 = 102.5 (.001)$
School Factors	.70	.57	$X^2 = 86.2 (.001)$	$X^2 = 44.7 (.001)$
Effective Approaches	.69	.60	$X^2 = 464.3 (.001)$	$X^2 = 325.8 (.001)$

Table 2: Overview of sampling adequacy and sphericity tests for factor analyses

### Factor Analysis for the Family Environment category

Overall BCQ\_1 and BCQ\_2 component loadings for the *Family Environment* category are displayed in Table 3, and analyses of these loadings for each administration of the BCQ are presented below. Importantly, these analyses do seem to reveal pre- and post-unit changes that are pertinent to the behaviour management unit.

The BCQ\_1 analysis for *Family Environment* revealed two underlying components. The first component loaded strongly on items relating to poor attachment between parent and child (**Attach**), marital conflict (**Marital**), and parents' low educational background (**Lo-Ed**), with moderate loading also apparent for lenient parental discipline (**Lenient**) and parents' low income (**Lo\$**). This component could be labelled the 'Disconnected Parent' factor, and accounted for 39.7 per cent of the response variance for the *Family Environment* category.

The second component loaded high on parents' inability to help the child (**Hlp\_Prnts**), excessively strict parental demands (**Strct\_Prnts**), and having many members in the family (**Fam\_Mbrs**), with moderate loading also visible for parents' low educational background (**Lo-Ed**) and lenient parental discipline (**Lenient**). This component could be called the 'Overwhelmed Parent' component, and accounted for a further 13.6 per cent of the response variance for this category. It is to be noted that both these components (accounting for 53.3 per cent of the response variance for this part of the BCQ) represent a pre-unit perception that many students misbehave at school because they come from a family environment characterised by disconnected, authoritarian parenting coupled with inconsistent (lenient) applied consequences.

Analysis of the BCQ\_2 *Family Environment* category also revealed two main components. The first, accounting for 25.9 per cent of the response variance, still loaded high on items relating to poor attachment between parent and child (**Attach**), marital conflict (**Marital**), and parents' low educational background (**Lo-Ed**). However, an increased emphasis on parents' inability to help the child (**Hlp\_Prnts**) occurred in these post-unit responses, and a strong negative shift occurred for strict parenting (**Strct\_Prnts**: from .027 to -.204) and lenient parental discipline (**Lenient**: from .412 to .047).

Parents' inability to help the child relates to the absence of positive reinforcement in the student's environment, while strict parenting and lenient parental discipline have to do with the imposition of strict rules and the lack of rule consequence in the family environment, respectively. Thus, whereas this component still emphasises parental disconnect, the lack of positive reinforcement from parents is viewed as more influential in these BCQ\_2 responses, and the importance of consistent rule following appears to have diminished. This may indicate that a reappraisal of the reward/punishment relationship occurred for the students undertaking this unit, in relation to their perceptions of 'disconnected parenting' as a cause of misbehaviours at school.

The second BCQ\_2 *Family Environment* component, accounting for 21.5 per cent of variance, also displayed changes. Again, this component revealed a structure that could be identified as representing a particular type of family environment - where many siblings compete, a significant lack of parental support exists, a strict emphasis on rules applies, yet the application of consequences for these rules remains quite lax. This seems to suggest a stereotype concerning student home environments where the parents are feeling overwhelmed and unable to engage with their children effectively.

However a notable change between the BCQ\_1 and BCQ\_2 responses for this component occurred in relation to the perceived influence of education, with the impact of low parental education falling from .428 for the BCQ\_1 to just .125 for the BCQ\_2. This may indicate a perceptual change in the influence of education as a risk factor for non-effective parenting, and suggests a perception whereby the inconsistencies that derive from feeling overwhelmed were no longer seen as pertaining primarily to parents with low educational backgrounds at the BCQ\_2 administration.

Family Environment Item	BCQ1_Fact1	BCQ2_Fact1	BCQ1_Fact2	BCQ2_Fact2
Attach	.758	.719	.184	.131
Marital	.854	.774	-.036	-.063
Lo_Ed	.601	.641	.428	.125
Hlp_Prnts	.216	.346	.770	.667
Strct_Prnts	.027	-.204	.753	.744
Fam_Mbrs	.228	.336	.667	.577
Lenient	.412	.047	.421	.583
Lo\$	.498	.517	.333	.101

Table 3: Overview of component loadings for the BCQ items relating to Family Environment

### Factor Analysis for the Student Factors Category

The BCQ\_1 and BCQ\_2 component loadings for the *Student Factors* category are displayed in Table 4. Again, these analyses reveal pre- and post-unit changes that are pertinent to the behaviour management unit.

The first analysis for *Student Factors* (BCQ\_1) revealed four underlying factors. The first factor is labelled 'Mismatched Student', because it loaded high on items indicating that students misbehave because they have low intelligence (**Lo\_IQ**), health problems (**Health**), and are unable to cope with the demands of school (**Cope**). This component accounts for 24

per cent of the response variance for the *Student Factors* category. The second factor is labelled ‘Out of Control Student’, because it loaded high on items that represent students’ inability to control their behaviour and lack of understanding concerning how to behave in a school context. This factor accounted for a further 16.7 per cent of the variance for this category. The third factor (13.7 per cent of the response variance for this part of the BCQ\_1) could be called the ‘Competing for Attention’ factor, as it loaded high on items indicating that students misbehave because they wish to attract attention and compete with other students. The final BCQ\_1 component was labelled the ‘Ill-Suited Student’, because it relates to items that suggest students misbehave because they have an innate predisposition that causes them to dislike school. This factor accounted for 12 per cent of the variance in the BCQ\_1 *Student Factors* category. Together, these four factors explained 66.4 per cent of the variance in student responses to the BCQ\_1 *Student Factors* category.

Analysis of the BCQ\_2 *Student Factors* category revealed three factors that cumulatively accounted for 58 per cent of the response variance for this category: ‘Socially Inept Student’ (28.6 per cent – student misbehaves because they don’t understand, don’t fit in, and are not accepted by others), ‘Acting-Out Student’ (15.6 per cent - bored, cannot cope, and generally dislikes school), and, again, the ‘Out of Control Student’ (13.8 per cent - innate temperament makes them unable to control their actions at school).

Student Factors Item	BCQ1_ Fact1	BCQ2_ Fact1	BCQ1_ Fact2	BCQ2_ Fact2	BCQ1_ Fact3	BCQ2_ Fact3	BCQ1_ Fact4
Tmprmnt	-.127	-.009	-.023	-.014	-.062	.865	.894
Attn	-.149	.034	.185	.777	.812	.178	-.006
Stn_Cntrl	.222	.185	.854	.081	.053	.770	-.045
Stn_Expcts	-.047	.655	.853	.106	-.032	-.126	.057
Lo_IQ	.744	.709	.023	-.112	.025	.231	-.025
Cope	.705	.041	.299	.791	.070	-.123	.372
Health	.644	.681	.000	.112	.041	.186	-.093
Dislikes	.222	.546	.045	.502	.435	.064	.554
Cmptes	.235	.683	-.194	.048	.763	.028	.064

Table 4: Overview of component loadings for the BCQ items relating to Student Factors

### Factor Analysis for the Teacher Factors Category

The BCQ\_1 and BCQ\_2 component loadings for the *Teacher Factors* category are displayed in Table 5. Note that the pre-unit (BCQ\_1) responses to this category identified only a single factor, accounting for 47.3 per cent of response variance for the category. This factor was termed the ‘Pygmalion’ factor, because it seemed to view everything the teacher does as having a highly significant influence on student behaviours.

In the BCQ\_2 responses to this category, two factors were identified which together accounted for 55.4 per cent of the variance. The first of these factors overlapped somewhat with the initial ‘Pygmalion’ factor, yet there was a lessening of perceived teacher influence in terms of teaching style and general classroom management skills for this factor, and a significant negative shift in the role that the teacher’s personality played in relation to the perceived influence of this factor. Perhaps this version of the ‘Pygmalion’ factor could be better labelled the ‘Authoritarian Teacher’ factor, as the emphasis seems to have shifted to misbehaviours stemming from generalised teacher rejection, the teacher not teaching to the student’s level, and the teacher creating a climate of excessive demands in the classroom.

The second teacher factor to emerge from the BCQ\_2 responses focused mainly on the teacher’s personality as a distinctive influence that interacts with teaching style and the teacher’s general classroom management approach. This factor could be called the

‘Mismatched Teacher’, because it suggests that student misbehaviours are often the result of personality clashes between the teacher and a student or group of students.

Teacher Factors Item	BCQ1_Fact1	BCQ2_Fact1	BCQ2_Fact2
Tch_Styl	.696	.444	.555
Tch_Prns	.552	-.085	.849
Tch_Rejcts	.783	.826	-.056
Prv_Tchrs	.658	.610	.113
Tch_Meth	.750	.731	.176
ClssMngt	.637	.485	.501
Dmnds	.713	.624	.358

**Table 5: Overview of component loadings for the BCQ items relating to Teacher Factors**

### Factor Analysis for the School Factors Category

The BCQ\_1 and BCQ\_2 component loadings for the *School Factors* category are displayed in Table 6. Pre-unit responses for this category identified two factors, the ‘Unsupported Student’ (29.5 per cent), and the ‘Socially Isolated Student’ (26.6 per cent), which together accounted for 56.1% of the response variance for the category. The emphasis in these pre-unit responses seems to be that schools cause student misbehaviours by not providing the right supports for high needs students, and by not ensuring that proper social inclusion is maintained for students on the periphery and perhaps within large classroom situations.

The post-unit responses for this category indicated three components: The ‘Disadvantaged School’ factor (26.2 per cent), the ‘Mismatched Curriculum’ factor (25.1 per cent), and the ‘Poor School-wide Discipline’ factor (19.1 per cent), accounting in total for 70.4 per cent of the variance in the response set.

Here, the school’s role in causing misbehaviours is viewed as stemming from three distinct factors: its inability to provide adequate resourcing to students, its failure to differentiate the curriculum for lower ability students, and its negative approach to discipline. Thus, whereas the initial perception of students undertaking the behaviour management unit was that schools contributed to student misbehaviours by not supporting more ‘needy’ students sufficiently, and by not controlling for social inclusion, by the end of the unit they perceived the school’s role in terms of overall resourcing, the relationship between student behaviours and instructional delivery, and the need to provide a positive disciplinary system.

School Factors Item	BCQ1_Fact 1	BCQ2_Fact 1	BCQ1_Fact 2	BCQ2_Fact 2	BCQ2_Fact 3
EBD	.709	-.260	.141	.816	-.194
Curric	.739	.309	.251	.730	.117
DiscSys	.805	.017	.090	-.007	.937
PeerRjct	.028	.519	.837	.548	.196
ClssSze	.207	.693	.818	.077	.257
SES	.174	.813	.368	-.013	-.332

**Table 6: Overview of component loadings for the BCQ items relating to School Factors**

### Factor Analysis for the Effective Approaches Category

Because there were more factors for this category, the pre (BCQ\_1) and post (BCQ\_2) components for the *Effective Approaches* category are presented in two separate

tables, with the BCQ\_1 loadings displayed in Table 7, and the BCQ\_2 loadings displayed in Table 8.

The pre (BCQ\_1) component loadings for this category indicated four factors relating to how the teacher should deal with inappropriate classroom behaviour: ‘Seek Help’ (17.7 per cent - from other teachers, school counsellor or the principal), ‘Rational Relationship’ (17.2 per cent - where the teacher explains management decisions to students, and seeks to establish a positive relationship), ‘Punitive’ (13.5 per cent - involving the use of threats and punishments), and ‘Differentiate & Reinforce’ (12.0 per cent - individualising teaching and using positive reinforcement to motivate). Together, these four factors accounted for 60.4 per cent of the response variance for this category.

Effective Approaches Item	BCQ1_Fact1	BCQ1_Fact2	BCQ1_Fact3	BCQ1_Fact4
Cnsel	.489	.192	-.060	.473
Threats	.068	-.296	.629	.227
ILP	.191	.041	.029	.740
Rwrds	-.082	.294	.115	.748
Explain	.156	.672	.120	.376
Supprt	.092	.731	-.253	.148
Trust	-.028	.624	-.052	.136
Expn_Prob	.292	.737	.085	.072
Recrds	.203	.585	.191	-.298
Remve	-.089	.121	.844	-.015
TmeOut	.347	.018	.674	.028
Help_Tch	.805	.160	.025	-.012
Hlp_Cn	.863	.203	.053	.141
Hlp_Prn	.752	.013	.345	.040
Infrm_Prn	.343	.138	.445	-.342

**Table 7: Overview of component loadings for the BCQ\_1 items relating to Effective Approaches**

The post (BCQ\_2) component loadings for this category indicated five factors: ‘Mediation’ (15.1 per cent - counsel the student but also involve the principal and parents to support the process), ‘Whole-school Consequences’ (14.1 per cent - explain the rules to students, and get other teachers & the principal to support these consistently), ‘Supportive Relationship’ (12.6 per cent - focus on building confidence and trust), ‘Differentiate & Reinforce’ (again), and ‘Rational Consequences’ (10.4 per cent - explain to the student why their behaviour is a problem and link this to the use of timeout to remove the student from the situation). Together, these five factors account for 64.4 per cent of the response variance for this category.

Although the Effective Approaches loadings are low, it is still of interest that the ‘Differentiate & Reinforce’ factor included an emphasis on keeping records in the responses (after having produced a negative loading for this same item in the pre-unit responses), as well as negative loadings for the use of threats and removal from class. This suggests a management approach that is based on meeting the needs of the student, coupled with the use of systematic data collection, and the absence of punitive measures.

Effective Approaches Item	BCQ2_Fact1	BCQ2_Fact2	BCQ2_Fact3	BCQ2_Fact4	BCQ2_Fact5
Cnsel	.637	.222	.321	-.061	-.064
Threats	.214	-.061	-.197	-.552	.189
ILP	-.016	.088	.034	.737	-.088
Rwrds	.258	.001	-.140	.621	.184
Explain	-.002	.761	.297	-.166	.348
Supprt	.078	.208	.755	.021	-.029
Trust	.263	-.012	.740	.127	-.088
Expn_Prob	.015	.140	.477	-.069	.670
Recrds	.391	.000	.414	.467	.341
Remve	.284	.003	-.231	-.410	.535
TmeOut	-.025	.006	-.135	.056	.683
Help_Tch	.146	.850	.066	.216	-.062
Hlp_Cn	.582	.515	.123	.326	.034
Hlp_Prn	.628	.655	-.078	.017	-.096
Infrm_Prnts	.823	.017	.144	-.031	.146

**Table 8: Overview of component loadings for the BCQ\_2 items relating to Effective Approaches**

### Knowledgeable Learning and Trans-unit Conceptual Changes

Important aspects of understanding the learning that has occurred in this unit include identifying where change has occurred most, where clarity is not apparent in the change, and what associations can be made between student change and the core unit outcomes. Correspondences between trans-unit changes and core unit concepts can also reveal important information for ongoing unit design and delivery.

Table 9 provides an overview of the changes and associations that occurred for each of the BCQ categories, together with the core unit concepts relating to these changes.

BCQ Category	Pre-Unit Emphasis	Post-Unit Emphasis	Relevant Unit Concepts
<i>Family Environment</i>	Poor parenting Marital conflict Lenient discipline	Lack of + reinforcement Strict (punitive) parenting	ABC analysis & PPA
<i>Student Factors</i>	Student not capable No self-control Innate temperament (higher pre-unit loading: entity view)	Student has skill deficits Insufficient social skills Innate temperament (lower post-unit loading)	Functional Assessment Use of IEP, ILP, & BIP
<i>Teacher Factors</i>	Teacher is widely responsible for most student behaviours	Authoritarian teaching style Personality clashes	Rule negotiation Inclusive management style
<i>School Factors</i>	Failure to support high needs students Lack of inclusion at the school	Instructional differentiation Need to use a positive disciplinary approach	Notion of curriculum mismatch Constructive Discipline
<i>Effective Approaches</i>	Teacher seeks authoritative support Provides clear rationale to students Punishes misbehaviour Differentiates the curriculum	Teacher/student negotiations Establishing common understandings Decreased use of punishment	Use of CBA Systematic, school-wide management approach Proactive management strategies Use of sociometric evaluation

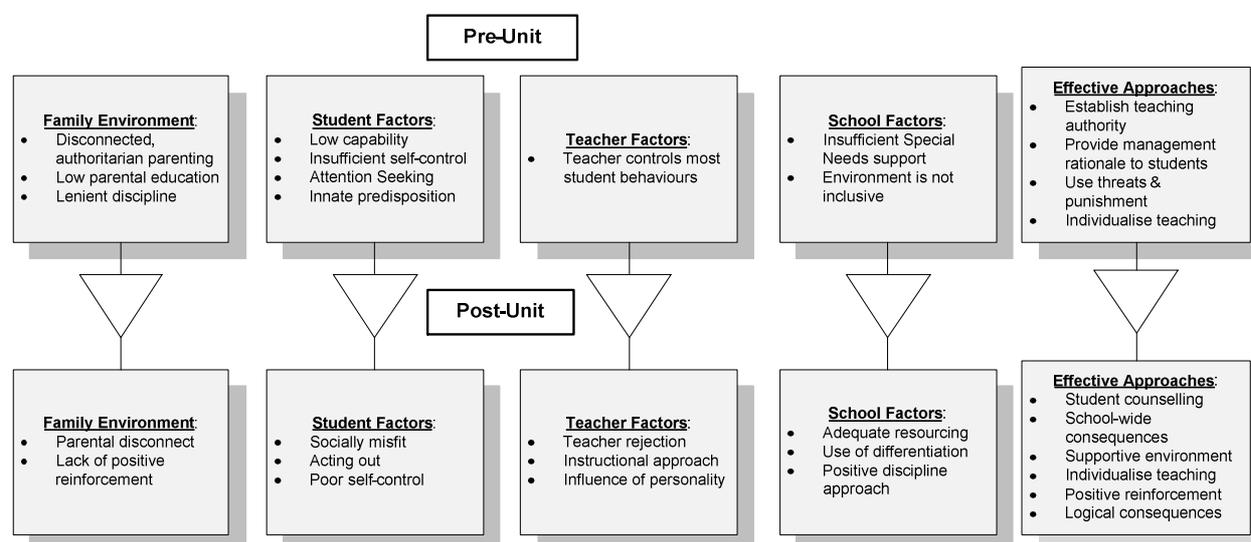
**Table 9: Overview of pre to post-unit changes and relevant unit concepts, by BCQ category**

In order to interpret these changes, factor analysis has been used as a measure of the knowledgeable learning that has taken place for the students undertaking this behaviour management unit. This learning can be understood as a type of value-adding in the sense that these changes indicate conceptual growth for the students, with respect to their understanding of the causes of student misbehaviour in schools and how to effectively manage such behaviour. Table 10 displays the relationship between knowledgeable learning and the factors as analysed here.

<b>BCQ Category</b>	<b>Pre-Unit Components</b>	<b>Post-Unit Components</b>	<b>Knowledgeable Learning</b>
<i>Family Environment</i>	Disconnected Parent Overwhelmed Parent <u>Emphasis:</u> <ul style="list-style-type: none"> <li>• Generally poor parenting</li> <li>• Marital conflict</li> <li>• Lenient discipline</li> <li>• Low-parental education</li> </ul>	Modified Parental Factors <u>Emphasis:</u> <ul style="list-style-type: none"> <li>• Lack of +reinforcement in the home</li> <li>• Punitive parenting style</li> <li>• Less influence of low education</li> </ul>	- Reappraisal of the reward/punishment relationship - Reappraisal of low education as a stereotypic parental risk factor
<i>Student Factors</i>	Mismatched Student Out of Control Student Competing for Attention Ill-Suited Student <u>Emphasis:</u> <ul style="list-style-type: none"> <li>• Innate lack of ability</li> <li>• Negative social skills</li> <li>• Desire to compete for attention</li> <li>• Innate dislike of school</li> </ul>	Socially Inept Student Acting-Out Student Out of Control Student <u>Emphasis:</u> <ul style="list-style-type: none"> <li>• Inability to cope</li> <li>• Social mismatch with school environment</li> </ul>	- Shift from temperament and innate lack of ability to social and academic skills deficits
<i>Teacher Factors</i>	Pygmalion <u>Emphasis:</u> <ul style="list-style-type: none"> <li>• Influence of teacher personality</li> <li>• Ability to control classroom environment</li> </ul>	Modified Pygmalion Mismatched Teacher <u>Emphasis:</u> <ul style="list-style-type: none"> <li>• Teacher rejection</li> <li>• Instructional mismatch</li> <li>• Demanding classroom climate</li> <li>• Personality clashes</li> </ul>	- Shift from a more hierarchical, teacher-controlled classroom, to a more interactive, teacher-led classroom - Teacher's personality remains central to classroom behaviour
<i>School Factors</i>	Unsupported Student Socially-Isolated Student <u>Emphasis:</u> <ul style="list-style-type: none"> <li>• Insufficient special needs supports</li> <li>• Inadequate social inclusion</li> </ul>	Disadvantaged School Mismatched Curriculum Poor School-Wide Discipline <u>Emphasis:</u> <ul style="list-style-type: none"> <li>• Inadequate general resourcing</li> <li>• Failure to differentiate the curriculum</li> <li>• School has negative approach to discipline</li> </ul>	- Reappraisal of school's role in resourcing - New insight into the relationship between student behaviours and instructional delivery - Clear imperative for positive discipline system
<i>Effective Teaching Factors</i>	Seek Help Rational Relationship Punitive Differentiate & Reinforce <u>Emphasis:</u> <ul style="list-style-type: none"> <li>• Authoritarian collegial support</li> <li>• Punishment of misbehaviours</li> <li>• Need to differentiate</li> </ul>	Mediation Whole-School Consequences Supportive Relationship Differentiate & Reinforce <u>Emphasis:</u> <ul style="list-style-type: none"> <li>• Counselling student</li> <li>• Holistic discipline system</li> <li>• Building confidence &amp; trust</li> <li>• Need to differentiate</li> </ul>	- Reappraisal of how to utilise collegial support - Increased emphasis on building positive relationships - Increased importance of differentiation

**Table 10: Overview of knowledgeable learning in relation to pre- and post-unit components**

Overall, it appears that generalised pre-unit concepts concerning the importance of rules, teacher authority, and logically applied punishments largely changed to concepts emphasising student skill deficits, instructional differentiation, and the application of positive reinforcement across the unit. Figure 1 provides an overview of the knowledgeable learning concerning behaviour management that can be devised from these pre- to post-unit responses.



**Figure 1: Overview of conceptual change concerning the causes of misbehaviour at school.**

Looking at these changes more closely, it seems the two categories concerning student input into misbehaviour at school (*Family Environment* and *Student Factors*) both decreased in terms of the overall variance they accounted for across the unit.

In contrast, the *Teacher Factors*, *School Factors* and *Effective Approaches* categories all increased in the amount of variance they accounted for across the unit.

This is of interest, because the changes relating to *Teacher Factors*, *School Factors* and *Effective Approaches* lie at the heart of management training, as these areas comprise the aspects of management most controllable by teachers.

This may indicate that a primary outcome of knowledgeable learning for the unit has been a shift in the perceived causes of misbehaviour at school - from the student and her or his home, to the teacher and the school. In general, this suggests a reappraisal of the reward/punishment relationship across the unit, with the pre-unit conception that a lack of teacher authority and weakly applied punishments are what lead to misbehaviour changing to a post-unit conception that it is the absence of positive interconnectedness and positive incentives that leads to misbehaviour.

These changes are entirely in keeping with the goals and objectives of the behaviour management unit undertaken by the students, and are therefore viewed as an indication that these students have critically considered the more positive, proactive model of behaviour management being taught in the unit. Thus, knowledgeable learning seems to have taken place in relation to the main concepts and principles of behaviour management as represented in this particular unit.

## Limitations of These Analyses

The main limitation for these pre and post-unit comparisons is that there is no way to categorically determine the influence of non-unit factors on the conceptual changes that occurred across this unit of learning, including input from other units and personal student experiences. It must also be acknowledged that the factors as analysed here cannot be construed as causal to these changes, especially in light of the fact that several factor loadings were quite low.

In spite of these limitations, many of these changes appear to correspond closely to specific concepts and principles as taught in the unit, and thus suggest that much of the change occurred in response to, or at least as related to, the specific learning associated with the unit of interest.

## Future Directions

Knowledgeable learning, as a form of value-adding, represents the integration of theory and practice at a conceptual level. As technology continues to 'massify' education, universities are required to progressively develop precise analytic tools for identifying how, where, and why concepts change. Applying these analyses to the unit of interest here, it is clear a need exists to establish greater clarity concerning Mayer's (1999) notion of schools providing positive interconnectedness as the basic principle for managing school behaviours proactively and inclusively.

Student responses to the BCQ items representing these aspects of unit learning were quite weak, and therefore it can be inferred that the knowledgeable learning in relation to this particular concept was not as robust as expected for the unit. Practicum placement observations, group discussions, and perhaps role playing by the students could all provide a means for communicating this concept in a way that integrates conceptual understanding and practical application. This may be particularly important in light of the broader, transnational and trans-cultural commercialisation of knowledge that often characterises international teacher training across university sectors. Yet it is also important in relation to the training of pre-service teachers across regional as well as suburban areas within both public and private Australian educational settings.

Indeed, the analysis of unit design and delivery is vital to the improvement of teacher training across universities worldwide, and overall the shift that is recorded here, from a punishment-oriented and entity-operating view of misbehaviour in schools to a reinforcement-oriented and contextually-driven view, is universally indicative of modern educational approaches to behaviour management.

Future research in the area of knowledgeable learning and behaviour management should seek to test additional online engagement activities in order to refine and improve the specific learning outcomes and goals of behaviour management as these are taught in individual university degrees. Time permitting; the use of student focus-group discussions, based on formative (pre-unit) engagement data, would be one way to increase the extent of knowledgeable learning that occurs using this approach.

With respect to these current analyses, it can be said that questionnaires are able to scaffold the evaluation of student learning for a unit when they are used to apply the core concepts and principles of the unit. There is a clear sense that the knowledgeable learning students experienced in relation to this unit contributed to their conceptual repurposing as teachers in training, and the use of an online questionnaire seemed to support this process at a meaningful level.

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## Appendix A: The Behavioural Causes Questionnaire (BCQ)

The purpose of this activity is to gather evidence concerning your thinking about the causes of inappropriate classroom behaviours, and about which management approaches work best for dealing with inappropriate behaviours. Please respond to the questionnaire items as candidly as possible. Note that indicating the first response that comes to mind for each item, without going back to second-guess this response, will likely provide the most authentic response set. Once you've completed the questionnaire, please submit it using the upload link provided online. Please remember that although your participation in this questionnaire is

appreciated, it is entirely voluntary - you are not required to complete this questionnaire for any unit-related purposes. De-identified questionnaire results will be analysed, and may be used for publication purposes.

**A) What Causes Problem Behaviours?**

**For this section, please rate your perceptions concerning the relative causes for inappropriate student behaviour at school and in classrooms:**

**(mark either 1, 2, 3, 4, or 5, where 1 = Least likely & 5 = Most likely)**

**FAMILY ENVIRONMENT**

1.	Poor attachment between parents and child	1	2	3	4	5
2.	Parental conflicts/marital problems	1	2	3	4	5
3.	Parents low educational background	1	2	3	4	5
4.	Parent's inability to help child	1	2	3	4	5
5.	Excessively strict parental demands	1	2	3	4	5
6.	Many members in the family	1	2	3	4	5
7.	Lenient parental discipline	1	2	3	4	5
8.	Parent's low income	1	2	3	4	5

**STUDENT FACTORS**

1.	Innate personality/temperament	1	2	3	4	5
2.	The student wants to attract attention	1	2	3	4	5
3.	The student cannot control his/her behaviour	1	2	3	4	5
4.	The student does not know what is expected	1	2	3	4	5
5.	Student's low intelligence level	1	2	3	4	5
6.	Student unable to cope with school demands	1	2	3	4	5
7.	The student has health problems	1	2	3	4	5
8.	The student dislikes school (or school work)	1	2	3	4	5
9.	The student competes with other children	1	2	3	4	5

**TEACHER FACTORS**

1.	Teaching style (authoritarian, democratic)	1	2	3	4	5
2.	Teacher's personality (distant, friendly, etc)	1	2	3	4	5
3.	Teacher's inappropriate manner towards the student (i.e., rejects the child)	1	2	3	4	5
4.	Inappropriate manners towards the student from previous teacher(s)	1	2	3	4	5
5.	Inadequate teaching method for the child	1	2	3	4	5
6.	Poor classroom management	1	2	3	4	5
7.	Climate of excessive demands in class	1	2	3	4	5

**SCHOOL FACTORS**

1.	Lack of support for EBD student	1	2	3	4	5
2.	Irrelevant Curricula for interests	1	2	3	4	5
3.	Poor school disciplinary system	1	2	3	4	5
4.	Bad school experiences (e.g., peer rejection)	1	2	3	4	5
5.	Class size too large	1	2	3	4	5
6.	Socio Economic level of school area	1	2	3	4	5

**B) How to Deal With Problem Behaviours?**

**For this section, please rate the following behaviour management approaches from least to most effective in terms of how the teacher should deal with inappropriate classroom behaviour:**

**(mark either 1, 2, 3, 4, or 5, where 1 = Least effective & 5 = Most effective)**

**EFFECTIVE MANAGEMENT APPROACHES**

1.	Counsel the student	1	2	3	4	5
2.	Use threats (e.g., send to the principal)	1	2	3	4	5
3.	Individualise teaching with the student	1	2	3	4	5
4.	Use rewards and positive incentives	1	2	3	4	5
5.	Explain the class/school rules	1	2	3	4	5
6.	Behave supportively toward the student	1	2	3	4	5
7.	Gain student's confidence and trust	1	2	3	4	5
8.	Explain to the student why their behaviour is a problem	1	2	3	4	5
9.	Keep records of the student's behaviour	1	2	3	4	5
10.	Remove the child from the class	1	2	3	4	5
11.	Use timeout	1	2	3	4	5
12.	Ask other teachers for help	1	2	3	4	5
13.	Ask the school counsellor for help	1	2	3	4	5
14.	Ask the principal for help	1	2	3	4	5
15.	Inform parents of the student's behaviour	1	2	3	4	5