Measuring Teams-Based Interprofessional Education Outcomes in Clinical Dentistry:
Psychometric Evaluation of a New Scale

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Abstract

PURPOSE/OBJECTIVES: The literature on interprofessional education (IPE) assessment revealed the need to evaluate the influence of interprofessional teams-based processes on the quality of clinical dental education. This study aimed to develop a valid and reliable instrument to evaluate the effectiveness of interprofessional teams-based treatment planning (TBTP) on the quality of clinical dental education received at the Griffith University School of Dentistry and Oral Health (DOH). **METHODS:** In this study, a scale was developed and evaluated to measure ‘interprofessional student team processes’ and the ‘quality of clinical dental education’ received amongst dentistry, oral health therapy and dental technology undergraduate students. A face validity analysis by IPE experts confirmed that items within the scale reflected the meaning of relevant concepts. After piloting, 158 undergraduate students (61% response rate) involved with TBTP participated. **RESULTS:** An exploratory factor analysis using the principal component method retained twenty-three items with a total variance of 64.6% suggesting high content validity. Three subscales accounted for 45.7%, 11.4% and 7.5% of the variance respectively. Internal consistency of the scale ($\alpha = .943$) and subscales 1 ($\alpha = .953$), 2 ($\alpha = .897$) and 3 ($\alpha = .813$) were high. A reliability analysis yielded moderate ($r_s = 0.43$) to high correlations (0.81) with the remaining scale items. Confirmatory factor analyses verified convergent validity and confirmed that this structure has a good model fit. **CONCLUSION:** This instrument might be useful in evaluating ‘interprofessional teams-based processes’ and their influence on the ‘quality of clinical dental education’ received in dental educational institutions.

Keywords: Interprofessional Education, Interprofessional Teams-Based Treatment Planning, Quality in Clinical Dental Education, Psychometric Evaluation, Reliability, Validity.

INTRODUCTION

Interprofessional education (IPE) has been defined as ‘when two or more professions learn with, from and about each other to improve collaboration and the quality of care’.¹

Teamwork and collaboration involving two or more professions; knowledge of roles/responsibilities, mutual respect between collaborating professionals and improved patient outcomes are known to be IPE sequels.²⁻⁴

The need for a more rigorous evaluation of IPE interventions, particularly involving student teams, has been documented.^{5, 6} This need also extends to evaluating interprofessional student team processes in oral health education when planning and managing patient treatment. In particular, the educational impact from employing interprofessional teams-based treatment planning (TBTP) processes needs to be evaluated by addressing the research question ‘What are the effects of interprofessional student team processes on the quality of clinical dental education received?’ Outcomes from this evaluation could guide improvements to TBTP processes and develop a model of effective IPE in clinical dental education.⁷

A literature search revealed a dearth of rigorous studies investigating interprofessional clinical education within oral health. In particular, the concepts ‘interprofessional student team processes’ and ‘quality in clinical dental education’ and any correlation between these concepts could not be adequately ascertained in the literature. Identified pre-validated instruments measuring ‘interprofessional student team processes’ included the Team Learning Behavior Questionnaire,⁸ the Readiness for Interprofessional Learning Scale,² the Interprofessional Team Performance Scale,⁹ the Mickan and Rodger Health Teams Model Scale,¹⁰ the Interdisciplinary Education Perceptions Scale¹¹ and the Shared learning Scale.¹² Five pre-validated instruments that contained ‘quality in clinical education’ constructs most likely to be affected by interprofessional teams-based processes were identified. These

included the Course Experience Questionnaire,¹³ the Clinical Learning Environment Scale,¹⁴ the Collaboration and Satisfaction About Care Decision measure,¹⁵ the Interprofessional Socialization and Valuing Scale¹⁶ and the System for Evaluation of Teaching Qualities instrument.¹⁷

Stone (2006) indicates that the quality of any program evaluation is dictated by the measures used to collect information.¹⁸ Due to the unavailability of an appropriate instrument to measure TBTP processes and IPE impacts in clinical dentistry, this study aims to develop a valid and reliable instrument to collect information from oral health students about interprofessional student team processes and the quality of clinical dental education received.

This paper reports on the development, pilot testing and psychometric evaluation of an instrument targeting oral health students.

MATERIALS AND METHODS

The Setting

Ethical approval to conduct this study was granted from the Griffith University Human Research ethics committee (GU Ref No: DOH/21/11/HREC).

The Griffith University School of Dentistry and Oral Health (DOH) clinic was established in 2004 with a suite of programs involving three dental disciplines, namely dentistry, oral health therapy and dental technology.¹⁹ In Australia, these disciplines are accredited as separate professions by the Australian Dental Council and the Dental Prosthetist and Dental Technician Boards of Queensland. Each discipline has documented professional attributes and competencies and are recognized as integral components of an oral health team.²⁰ Internationally, the terms ‘intraprofessional’ and ‘interprofessional’ may be transposed, thereby promoting confusion. As this study pertains to teams of oral health professionals from diverse disciplines, it adopts the term ‘interprofessional’ as opposed to ‘intraprofessional’ which refers to a team of professionals all of whom are from the same profession (for example, three dentists).²¹

In response to the current educational challenges, DOH introduced a novel concept of TBTP in 2009. This aimed to facilitate IPE in clinical dental education through emphasizing the importance of student teamwork, peer learning and appropriate team assessment strategies.²² A description of the TBTP process has been published previously,²³ where students from each year level and discipline were organized into clinical teams to collaboratively plan and manage treatment for allocated patients.

Scale Development

In 2012, a scale was developed from the instruments cited previously that identified both theoretical models and conceptual analyses of the concepts being investigated.

Appendix A illustrates the item numbers/wording comprising the new scale.

Items measuring constructs within the ‘interprofessional teams process’ likely to influence ‘quality in clinical dental education’ constructs were extracted. The teamwork constructs considered essential for assessing the TBTP process included roles/responsibilities, collaboration, professional identity, diversity, conflict, construction/co-construction, mutually shared cognition and team effectiveness (see Appendix B).

Items reflecting ‘quality in clinical dental education’ constructs likely to be influenced by the TBTP process were also extracted. These included learning climate, organizational quality, patient mix/relationships, staff-student relationships and teacher commitment (good teaching), appropriate assessment, generic skills and student satisfaction.

The instrument was designed according to established guidelines concerning scale development^{24, 25} and was implemented on-line to facilitate voluntary and anonymous response.

Four items collected student demographics, all of which the literature indicated could potentially confound any association.^{26, 27} A number of individual statements then appeared in a particular order to prevent response bias and allowed respondents to express their degree of agreement/disagreement through a ranked five point Likert scale. The survey contained twenty-three statements (items) measuring ‘interprofessional student team processes’ (items 5-27) and seventeen items measuring ‘quality in clinical dental education’ (items 28-44). Two open-ended questions collected information concerning ‘what is working’ and ‘what needs improving’ in relation to the interprofessional TBTP process.

Face Validity

Face validity was evaluated by consulting with clinical supervisors cognizant of the TBTP process and academic experts within IPE. Participants were asked to review the relevance of individual items with respect to measuring each construct adequately. Face validity was subjectively confirmed providing confidence that the new scale covered all concepts it intended to measure.

Participants and Procedure

The study population comprised 258 students who managed patients either directly in the clinic or indirectly through the dental laboratory. This cohort comprised of third year dental technology (n=9), third year oral health therapy (14), third year (70), fourth year (88) and fifth year dentistry (77) students.

To ensure feasibility, piloting of the new scale was conducted with a sample of thirty eligible students, **who were subsequently invited to participate in the study survey**. After minor modifications were made, students were informed of the study purpose, informed consent mechanism and given a link to the on-line instrument. The survey was designed for completion within fifteen minutes and was available for three weeks during September/October 2012, prior to the implementation of mandatory student evaluations and examinations. It was designed to receive single responses from participants and preserve anonymity.

Data Analyses

Collected data automatically downloaded into the Statistical Package for the Social Sciences (SPSS) version 21.0²⁸ for verification, cleaning and analysis. Responses were received from 158 of the 258 eligible students (61.2%). A missing data analysis indicated that 401 of 6,320 values (6.3%) were absent. Data missing for each item were replaced with

the mean categorical value of that item to increase the sample of data available and minimize error.

The Kaiser-Meyer-Olkin (KMO) measure and significance of Bartlett's test of Sphericity were used to respectively assess the sampling adequacy and suitability of data for factor analyses.²⁹

An exploratory factor analysis (EFA) was employed to explore the nature of the constructs influencing response and the principal component analysis (PCA) was applied to identify and reduce the number of variables measuring the same construct and assisted in discovering variables that loaded or correlated on particular factors or subscales.³⁰ The PCA also identified factors with eigenvalues greater than one that could be extracted for relevant analyses and a varimax rotation spread the variability more evenly amongst those factors.³¹ With a sample size between 150 and 200, sufficiency for this study existed where loading values were at least 0.4.³²

Reliability of the instrument was measured through two methods: Cronbach's alpha (α) and split-half reliability. A corrected item-total correlation analysis was also conducted to elicit how well each item correlated with the entire scale and with particular sub-scales.³³ As the nature of data collected was ordinal, Spearman's rho (r_s) reported correlations.

A confirmatory factor analysis (CFA) was conducted to confirm the scale constructs and convergent validity. Using the Mplus statistical software program, the CFA determined the fit of the retained factor model to the data and how well the identified variables clustered together to measure both the concepts 'interprofessional student team processes' and 'quality in clinical dental education'. In **general**, to minimize type I and II errors, several statistical tests representing absolute and relative fit indices should be used to determine how well the model fits to the data.^{34, 35} Kline (2010) advocates considering the Chi-squared test (χ^2), the Root mean square error of approximation (RMSEA), the Standardized root mean square

residual (SRMR) as absolute fit indices and Bentler's Comparative fit index (CFI) as a relative fit index.³⁶ As the Chi-squared test is susceptible to sample size and may result in a type I or II error if considered, the relative ratio between the Chi-square and its degrees of freedom (χ^2/df) is reported in this study to address this limitation.^{37, 38}

RESULTS

The demographic distribution between participants and the eligible student cohort appeared similar to relevant University records, except for minor differences related to year level and ethnicity. The impact of this difference on the representativeness of the student sample was deemed negligible.

Data related to items measuring ‘interprofessional student team processes’ and ‘quality in clinical dental education’ were found suitable for factor analysis as indicated by significant correlations of 0.4 or more in the correlation matrix, a high KMO measure of sampling adequacy (0.92) and a significant Bartlett’s test of Sphericity ($p < 0.001$). A PCA of the items revealed eight factors with an eigenvalue of one or more. These factors explained 71% of the variance. However seventeen of the items warranted further investigation. One item had a loading < 0.3 . Another seven items, despite moderately loading on particular factors, did not possess face validity in respect of particular factor themes, had a lack of commonality and subsequent reliability testing of these items was poor (Cronbach’s $\alpha = 0.661$, Spearman-Brown split-half reliability coefficient = 0.230). Eight items cross-loaded on a number of factors with a difference of < 0.2 between factors and one item correlated weakly with the sum of the remaining items ($r_s = 0.284$). If excluded, Cronbach’s α for the entire instrument would have increased.

The seventeen items investigated were consequently excluded from the scale. Another EFA and item analysis was performed on the remaining twenty-three items measuring ‘interprofessional student team processes’ (8 items) and ‘quality in clinical dental education’ (15 items) (See Appendix A for retained items).

After suitability of the data from the retained items was established, the ensuing PCA indicated that three factors with eigenvalues exceeding one explained 64.6% of the variance in the survey data. A parallel analysis using a Monte Carlo simulation of a randomly

generated data set³⁹ indicated that the eigenvalues of all three factors exceeded the corresponding ninety-five percentile of simulated values and that the variance in those three factors was greater than that obtained at random. This finding supported retaining the three factors for further investigation.

Table 1 displays the mean and standard deviation variations between each of the retained items in the new scale. It also illustrates corrected item-total correlations of these items to evaluate their fit both within the instrument and to particular subscales.

Insert TABLE 1

On a scale from one to five, the mean score for all items fell between 3.2 and 4.2. Despite this narrow range, the highest scores represented favorable responses towards shared learning with students in other oral health disciplines and staff-student interactions about working in teams (items 6, 11, 13, 34, 37 and 38). Some of the lowest scores reflected responses at that point in time where students had limited insight concerning what may comprise written communication between professionals, the sufficiency of patient cases to provide educational quality and patient satisfaction with treatment received from an oral health team (items 30, 31, 41 and 43). Correlations ranged from 0.43 to 0.81 indicating that all items possessed a moderate to strong correlation with the sum of the remaining items within the scale. The same magnitude of correlation persisted amongst each subscale. Removal of any of the items resulted in either the same or a lower Cronbach's α value for the entire scale.

The varimax rotated solution for the retained variables loading on to each of the three extracted factors in descending order of loading is presented in Table 2. Based on a sample

size of 158, a loading of at least 0.4 for each retained variable is sufficient to indicate that the variables within each factor are highly correlated.⁴⁰ All retained variables met this criterion.

Insert TABLE 2

The three extracted factors displayed an overall high reliability (Cronbach's $\alpha = 0.943$, Spearman-Brown split-half reliability coefficient = 0.872). The first factor labelled 'Interprofessional Shared Learning' reflected learning with, from and about oral health disciplines through a teams-based environment. This comprised twelve items (6, 10, 11, 12, 13, 14, 16, 28, 40, 41, 42, 43) which explained most of the variance (45.7%) and exhibited high reliability values (Cronbach's $\alpha = 0.953$, Spearman-Brown split-half reliability coefficient = 0.900). The second factor named 'Assessment' related to mentoring and monitoring the TBTP process through providing appropriate assessment on team performance. This factor included five items (34, 35, 36, 37, 38), explained 11.4% of the variance with demonstrated high reliability (Cronbach's $\alpha = 0.897$, Spearman-Brown split-half reliability coefficient = 0.871). The third factor, 'Clinical Teams-based Educational Outcomes' portrayed the educational effects that oral health students would experience though employing the TBTP process when planning treatment and managing patients. This factor encompassed 6 items (24, 30, 31, 32, 33, 44), explained 7.5% of the variance and possessed adequate reliability (Cronbach's $\alpha = 0.813$, Spearman-Brown split-half reliability coefficient = 0.810).

Table 2 indicates that six of the twenty-three items cross-loaded between factors. In order to make an objective judgment towards allocating these items to a specific factor, both the numeric loading and face validity of each item was considered. For example, the interprofessional concept of shared learning with, from and about other oral health disciplines

can be observed clearly in the items highly loading on to factor 1. Similarly, items allocated to the third factor demonstrate commonality with the theme ‘clinical teams-based educational outcomes’. Most of the cross-loading items were allocated based upon higher numeric loadings and evident face validity. It was deemed that item 44 be allocated to the third factor ‘Clinical Teams-based Educational Outcomes’ because of its face validity despite possessing a lower numerical loading on this factor.

Table 3 illustrates correlations between the three retained factors.

Insert TABLE 3

The correlation between the factors ‘Assessment’ and ‘Clinical Teams-based Educational Outcomes’ is weak (0.396) and between ‘Assessment’ and ‘Interprofessional Shared Learning’ (0.435) is moderate. The correlation between ‘Interprofessional Shared Learning’ and ‘Clinical Teams-based Educational Outcomes’ is stronger (0.637), but may still be categorized as moderate.^{15, 16}

Table 4 summarizes the CFA measure of fit findings.

Insert TABLE 4

The literature indicates the following cutoff values to achieve either a good or acceptable fit: χ^2/df should be < three (good fit) or < five (acceptable fit);⁴¹ RMSEA should be ≤ 0.05 (good fit) or ≤ 0.08 (acceptable fit); SRMR should be ≤ 0.08 (good fit);^{34, 37} CFI should be ≥ 0.95 (good fit) or ≥ 0.90 (acceptable fit).³⁴ Three of the four indices in Table 4 indicate that the three factor model represents an acceptable to good fit to the data collected.

DISCUSSION

Currently there exists a paucity of valid and reliable instruments to measure an association between the constructs ‘interprofessional student team processes’ and ‘quality in clinical dental education’. This paper reports both the process in developing a relevant instrument and its associated psychometric evaluation.

Consequent to establishing face validity, a psychometric evaluation of the new scale confirmed its reliability and validity. An EFA indicated that twenty-three items measuring the aforementioned constructs loaded on to three factors. Their nature, based upon the items loading on each factor, led to them being labelled ‘Interprofessional Shared Learning’ (12 items), ‘Assessment’ (5 items) and ‘Clinical Teams-based Educational Outcomes’ (6 items). These three factors explained 64.6% of the data variance suggesting a high level of content validity.

Through replacing missing values with mean scores, there is a risk that any association measured may be inflated and therefore increase the risk of type I error. However, the small proportion of replaced data is unlikely to impact upon any findings from analyses conducted to answer the research question.

The corrected item-total correlation indicated that all items had correlations > 0.3 , implying that each item contributed unique information. This correlation removes any bias that may be attributed to the item itself being included in the total score for the scale or sub-scale by removing a particular item score prior to the correlation.^{24, 42} It has been suggested that items demonstrating high inter-item correlations (i.e. > 0.8) are a repetition of each other and therefore asking the same question.^{42, 43} Upon examining items 10, 36, 40, 43 and 44, none exhibited correlations substantially above 0.8 and all appeared to be measuring different aspects of their sub-scales. It was therefore decided that omission of any of these items would result in capturing incomplete information and therefore bias findings.

The varimax rotation ensured maximum dispersion of loadings within factors so that the variability in data was distributed more evenly amongst these factors in order to maximize independence of the sub-scales.³¹ Two of the three possible correlations between these factors were weak and weakly moderate indicating that the factors ‘Interprofessional Shared Learning’ and ‘Clinical Teams-Based Educational Outcomes’ were each independent of ‘Assessment’. The moderate correlation between ‘Interprofessional Shared Learning’ and ‘Clinical Teams-Based Educational Outcomes’ may question their independence, however at this initial stage of instrument development, it was important to retain and analyze all sub-scales to ensure they were conceptually sound.

High reliability was reported with items loading on the factor ‘Interprofessional Shared Learning’, suggesting that a number of items measuring this factor were redundant.⁴⁴ After reviewing the nature of the items loading on to this factor, all appeared to measure different aspects and any omission would result in capturing incomplete information. Internal consistency and split half reliability findings for both the scale and sub-scales indicate that reliability is more than adequate to conduct exploratory research.

Establishing construct validity through making comparisons with other studies was not possible due to the innovative nature of this study. Convergent validity, a construct validity sub-type, was also confirmed through the CFA where retained items converged to reflect the three emerging factors and these factors converged to reflect concepts measured through the instrument. The CFA also confirmed a good fit of this model to the data suggesting that use of the model is plausible.

The 61% of students responding was representative of DOH students managing patients as part of their program. Student participation could be improved by implementing the survey earlier when most students would not be preparing for examinations. In addition, the importance of student participation could further be promoted and encouraged by

academics in positions of authority. If students participating in both the pilot and study survey responded differently to those not involved with the pilot, then the study findings would be contaminated. As the study survey did not collect information about pilot participation, the extent and direction of any possible contamination could not be determined. However, when considering favorable psychometric findings, small percentage of study participants involved with the pilot (11.6%) and implementation of a modified study survey, the effect of any contamination appears minimal.

It is possible that all aspects of the defined constructs may not have been identified and therefore not included in the student survey. However, a thorough search of the literature and consultation with experts confirmed that items measuring the aforementioned constructs included known aspects necessary to answer the research question.

Another limitation of this study is that measurement of criterion validity was not possible due to the lack of a suitable standard. Predictive validity, a sub-type of criterion validity, necessitates pilot-testing responses from a sub-group of the student sample against their participation in some future related event.⁴⁵ Ethical approval has been obtained to survey participant students when they are postgraduates from 2014 onwards. Findings related to interprofessional teams-based processes within the workplace will then permit suitable comparisons to inform predictive validity.

As this study was limited to a relatively small sample size, future research involving larger comparable study populations will assess the suitability of utilizing this scale within other oral health educational institutions that utilize IPE as part of their clinical education.

The literature signifies that apart from contemplating fit indices, a final judgment on use of the model must consider all aspects of the psychometric evaluation.^{46, 3838} In light of favorable psychometric findings, this scale may be deemed valid and reliable to investigate

the relationship between ‘interprofessional student team processes’ and ‘quality in clinical dental education’ received both within DOH and similar clinical educational environments.

CONCLUSION

The new scale was found to be both a reliable and valid instrument to collect relevant information to evaluate ‘interprofessional student team processes’ and their influence on the ‘quality of clinical dental education’ received. However, it may not be suitable to be administered within all tertiary oral health contexts. Additional studies within larger comparable study populations, nationally and internationally, are required to further establish the reliability and validity of this instrument targeting oral health students involved with interprofessional clinical education.

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TABLES

Table 1: Item Analysis of the 23 Item Scale targeting Oral Health Students

Questionnaire Items	Subscale	Mean (SD)	Corrected Item-Total Correlation full scale	Corrected Item- Total Correlation Subscale
6	1	4.2 (0.8)	0.48	0.53
10	1	3.5 (1.1)	0.77	0.81
11	1	3.8 (1.1)	0.73	0.76
12	1	3.4 (1.2)	0.75	0.83
13	1	3.8 (1.1)	0.72	0.79
14	1	3.7 (1.1)	0.67	0.75
16	1	3.7 (1.0)	0.59	0.59
24	3	3.7 (0.9)	0.45	0.42
28	1	3.6 (1.1)	0.76	0.75
30	3	3.3 (1.1)	0.54	0.64
31	3	3.2 (1.2)	0.43	0.62
32	3	3.7 (0.9)	0.50	0.62
33	3	3.7 (1.2)	0.47	0.53
34	2	3.9 (0.9)	0.45	0.72
35	2	3.4 (1.1)	0.54	0.68
36	2	3.7 (0.9)	0.52	0.81
37	2	3.8 (1.0)	0.50	0.77
38	2	4.0 (0.8)	0.52	0.77
40	1	3.6 (1.0)	0.81	0.80
41	1	3.2 (1.1)	0.76	0.77
42	1	3.4 (1.1)	0.78	0.80
43	1	3.3 (1.1)	0.78	0.81
44	3	3.5 (1.0)	0.62	0.85

Table 2: Principal Component Analysis showing the Varimax rotated factor structure for the 23 Item Scale targeting Oral Health Students

Questionnaire Items	Factor 1 Inter-professional Shared Learning (12 items)	Factor 2 Assessment (5 items)	Factor 3 Clinical Teams-based Educational Outcomes (6 items)
12	.862#		
14	.826		
13	.810		
10	.788		
43	.752		.307
42	.749		
11	.741		.348
41	.726		
40	.718		.329
28	.678		.333
6	.630		
16	.567		
36		.854	
37		.846	
38		.834	
34		.808	
35		.723	
31			.786
32			.757
30	.341		.714
33			.654
24			.447
44	.733		.431
Variance Explained	45.7%	11.4%	7.5%
Cronbach's Alpha	0.953	0.897	0.813
Spearman- Brown split- half reliability coefficient	0.900	0.871	0.810

The loadings in **bold** relate items to particular factors on which they load in descending order.

Table 3: Correlations among the Factors retained in the New Scale targeting Oral Health Students

FACTORS	1 Interprofessional Shared Learning	2 Assessment	3 Clinical Teams-based Educational Outcomes
1 Interprofessional Shared Learning	1.000*	0.435*	0.637*
2 Assessment	0.435*	1.000*	0.396*
3 Clinical Teams-based Educational Outcomes	0.637*	0.396*	1.000*

*p<0.01

Table 4: Confirmatory Factor Analysis of the 23 Item, Three Factor Scale targeting Oral Health Students

Measures of fit	CFA Output
Chi square (χ^2) at $p < 0.05$	487.86
Degree of freedom	221.00
Relative (χ^2/df) ratio	2.21
Root mean squared error of approximation (RMSEA)	0.09
Standardized root mean square residual (SRMR)	0.06
Comparative fit index (CFI)	0.90

APPENDIX A

Evaluation of the Teams Based Treatment Planning (TBTP) Process (Student Survey GU Ref No: DOH/21/11/HREC)

For each of the following questions please circle one option only

1. What is your Gender?
 - a. Female
 - b. Male
2. Which of the following programs and year level are you enrolled?
 - a. Bachelor of Oral Health in Dental Technology – 3rd year student
 - b. Bachelor of Oral Health in Oral Health Therapy – 3rd year student
 - c. Bachelor of Oral Health in Dental Science – 3rd year student
 - d. Graduate Diploma of Dentistry – 4th year student
 - e. Graduate Diploma of Dentistry – 5th year student
3. In which of the following age brackets do you belong?
 - a. 18-20 years
 - b. 21-25 years
 - c. 26-30 years
 - d. 31-35 years
 - e. 36 years and older
4. To which ethnic group do you most identify?
 - a. Non Indigenous Australian
 - b. Indigenous Australian (Aboriginal, Torres Strait Islander or Aboriginal & Torres Strait Islander)
 - c. Asian
 - d. Middle Eastern
 - e. European
 - f. North American
 - g. South American
 - h. African
 - i. Other

Please answer all of the following questions on a scale of 1 to 5 (1=Strongly Disagree; 2=Disagree; 3=Not Sure; 4=Agree; 5=Strongly Agree). For each statement please circle one option only.

5. It is important to learn about the roles/responsibilities of other oral health care professionals
6. The best way to learn about the roles/responsibilities of other oral health care professionals is by learning with them #
7. The function of Dental Technicians is mainly to provide support for Dentists
8. The function of Oral Health Therapists/Hygienists/Dental Therapists is mainly to provide support for Dentists
9. Students in my oral health care profession are willing to share information / resources with students in other oral health care professions
10. Shared learning through the TBTP process with oral health care students in other professions increases my ability to understand clinical problems

11. Shared learning through the TBTP process with oral health care students in other professions will improve relationships after graduation
12. Shared learning through the TBTP process with oral health care students in other professions helps me to communicate better with patients
13. Shared learning through the TBTP process with oral health care students in other professions helps me to communicate better with my colleagues
14. Shared learning through the TBTP process with oral health care students in other professions helps me to think positively about other oral health care professionals
15. Clinical/Laboratory problem solving skills can only be learned with students from my own oral health care profession
16. Within the TBTP process, I work collaboratively with students from other oral health care professions
17. All members of my team have similar goals concerning the TBTP process
18. All members of my team have strongly held beliefs about what is important concerning the TBTP process
19. There are personality conflicts evident in our team
20. There are conflicts about ideas related to the TBTP process in our team
21. In this team, I share all relevant information and ideas that I have
22. Team members elaborate on each other's information and ideas
23. Team members draw conclusions from the ideas that are discussed in the team
24. If there are differences of opinion our team addresses them directly
25. This team has a common understanding of the TBTP tasks we have to handle
26. This team has a common understanding of how to deal with TBTP tasks
27. I am satisfied with the performance of our team
28. The TBTP process provides a good learning environment to collaboratively treatment plan for patients/cases
29. The allocation of patients/cases to members of my team was well organized
30. There was sufficient variety in the patient/case problems available to me
31. The number of patients/cases I was exposed to this academic year was sufficient
32. I was given autonomy to manage patients/cases appropriate to my level of competence
33. The patients' needs really are given first priority
34. The TBTP clinical teaching staff organized sufficient time with our team leaders to provide advice
35. The TBTP clinical teaching staff made it clear right from the start what they expected from students
36. The TBTP clinical teaching staff demonstrated the required clinical skills to help our team learn about treatment planning
37. The TBTP clinical teaching staff made a real effort to understand difficulties our team might be having with the treatment planning process
38. The TBTP clinical teaching staff gave our team helpful feedback on how we were progressing
39. There is a clear link between the learning outcomes for the TBTP Module and the goals of the clinical course I am currently enrolled
40. The inter-professional TBTP process helped me develop my ability to work in an inter-professional team
41. The inter-professional TBTP process improved my skills in written communication (e.g. referrals)
42. The inter-professional TBTP process helped me to develop my ability to comprehensively treatment plan for my patients/cases

43. The inter-professional TBTP approach enhanced patient satisfaction with the level of care provided
44. Overall, I was satisfied with the quality of clinical education provided through the inter-professional TBTP process

45 Please list what aspects of the TBTP process worked well_____

46 Please list what improvements in the TBTP process are necessary_____

Thank you for your participation

Items retained subsequent to a factor analysis are highlighted

APPENDIX B – New Scale Items and Constructs Related

Item Numbers	Constructs	
1-4	Demographics	Social and informational Diversity
5-27	‘Interprofessional teams process’	
5-8		Roles/Responsibilities
9, 10, 11, 14, 16		Collaboration
12, 13, 15		Professional identity
17, 18		Diversity
19, 20, 24		Conflict
21, 22, 23		Construction/co-construction
25, 26		Mutually shared cognition
27		Team effectiveness
28-44	‘Quality in clinical dental education’	
28		Learning climate
29		Organizational quality
30, 31, 32, 33		Patient mix/relationships
34, 38		Staff-student relationships (good teaching)
35, 36, 37		Teacher commitment (good teaching)
39		Appropriate assessment
40, 41, 42, 43		Generic skills
44		Student satisfaction