Student attrition and academic and social integration: Application of Tinto's model at the University of Papua New Guinea

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Abstract. This study explores the compensatory relationship between academic and social integration, and also assesses the differences of group specific academic and social integration in a small university in the Pacific as perceived by the students. In order to reduce attrition through developing a relevant retention policy, a comprehensive group specific assessment of academic and social integration was necessary. Using the Tinto model and research instruments, an institutional academic and social integration assessment instrument was developed for measuring perceived integration climate for specific subject and year of studies groups. An important outcome of this study was the existence of a compensatory relationship between academic and social integration. Differences were found between perceived ratings of student groups for both academic and social integration.

Keywords: academic integration, attrition, college departure, dropout, social integration

Background

Studies of student retention in higher education have witnessed a marked increase over the last two decades. Fuelled by renewed concerns about the stable attrition rates between 42% and 50% (Bean 1980; NHEP 1990; Westcott 1995; Napoli and Wortman 1996; Mannan 1990), there has been growing interests in the construction of models and theories of student departure to explain the complex interactions of factors that are affecting student persistence or dropout. In 1975, Tinto published an interaction model of student attrition that laid the theoretical foundation for research about student attrition. Spady (1970, 1971) first suggested the application of Durkheimain's classical analysis of social factors involved in suicide (1951) to the phenomenon of student attrition. The model was further extended and refined by Tinto (1975, 1993).

Tinto's model posits that students enter into higher education institutions with a variety of attributes, family and community backgrounds,

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educational experiences and achievements, skills and value orientations. These background characteristics and individual attributes develop educational expectations and commitments, which the individual brings with him/her into the universities and colleges. As a member of the community, students interact with the academic and social systems of the college. The central concept of the Tinto model is the level of a student's integration into the social and academic systems of the college, which determines persistence or dropout. The higher the degree of integration of the individual into the college system, the greater will be the commitment to the specific institution and to the goal of college completion leading to persistence.

The predictive validity of the Tinto model was tested in various institutional settings, mostly in USA. Based on their studies in single institutions, Pascarella and Terenzini (1978, 1979, 1980) showed that the model appeared to be appropriate for exploring the complex interactions of factors that are affecting student persistence or dropout and also for predicting those students who are at risk. Pascarella et al. (1986) and Bers and Smith (1991) in their studies of community college students observed that both social and academic integration measures were significantly related to persistence.

Tinto's postulation of approximate parity between social and academic integration in their effects on dropout was disputed by Munro (1981), who in his study found strong effects of academic integration on persistence and social integration had no significant effect. Studies (Bean and Metzner 1985, 1987; Fox 1986) which reported insignificant effect of social integration on persistence did not take into account the compensatory nature of academic and social integration. Pascarella and Terenzini (1979) in their studies found a compensatory interaction between student and academic staff relationship variables which were considered as a measure of social integration, and academic staff concern for student development and learning, as a measure of academic integration. Research in student attrition has not provided much attention on the compensatory relationship between academic and social integration for the last two decades. This study focuses on the application of the Tinto model to explore the compensatory relationship between academic and social integration.

Tinto (1982) has aptly stated that sufficient attention should be given to the development of group-specific models or methods to study student attrition to make the research more policy relevant. However, previous research on student attrition has not adequately described

differences between students of different subject areas and year of studies with respect to the predictive variables influencing students' persistence/dropout.

In his study, Johnson (1996), examined the grade point average and learning experiences as a measure of academic integration, and found that dropout students from arts and education reported higher grade point averages than the science students. Evaluation of learning experiences revealed that dropout science students reported higher negative learning experiences which were followed by arts and education students. A review of student involvement in clubs and organisational activities and friendship, as a measure of social integration, shows that there were small differences between students in arts and education with no differences with science.

Other group specific studies (Moline 1987; Michaels and Miethe 1989) focussed on the establishment of relationships between subject areas and predictor variables, rather than the differences between the subject areas in respect of the degree of influence of predictive variables affecting persistence/withdrawal. Studies conducted by Scot et al. (1996) attempted to measure the differences of dissatisfaction as a reason for leaving university between science/technology, arts/humanities or business/law students.

Spady (1971) suggested that the effects of forces that lead to dropout during the first year will continue to have an impact on the attrition process during the ensuing year. Tinto (1982) further added that forces that influence students' persistence/dropout during the early stages of an academic career could be quite different from those that influence persistence/dropout during the subsequent years. Despite these conclusions, research on student dropout has largely concentrated on the first year, since first year is presumed to be the critical one in completing an undergraduate program (Iffert 1958; Eckland 1964; Marsh 1966; Nelson 1966) and attrition rates in the first year seemed to be very high compared to the succeeding years (Baumgart and Johnstone 1977; Pascarella and Terenzini 1977, 1979, 1980; Bean 1980; Johnson 1980; Munro 1981; Pascarella and Chapman 1983). Difference between the first year and later year students was further confirmed by the findings of a study conducted by Bean and Kuh (1984).

A study covering four succeeding years of a group of college students by Terenzini and Wright (1987) confirmed the results of an earlier study (Terenzini et al. 1984) that students' level of academic and social integration in the first year are expected to have a positive influence on the level of integration in the second year, junior and senior years. While

academic integration appears to have a more powerful influence in the first year and second year than social integration, it does not appear to be more influential as compared to social integration, in the junior and senior years. The level of academic and social integration varies during the undergraduate career due to the varying degrees of influence by the measures of integration variables, which in turn contribute at varying degrees to the persistence and dropout. Thus, it is important to identify the differences of perception of students at various stages of their undergraduate studies with respect to their academic and social integration for developing effective attrition policies.

The Tinto model had been applied mostly in developed countries where contextual conditions of higher education institutions are considered to be better than in the developing countries. Applicability of the Tinto model to cases of small developing countries like Papua New Guinea, in order to explore in-depth retention problems and to draw up policy measures is yet to be explored. Notwithstanding the implementation of the attrition model, the question of how to start a student attrition improvement initiative remains to be answered. A necessary first step towards developing and implementing a student retention program is the application of the Tinto model for self-assessment of the prevailing integration climate to identify areas of strength and weakness. It is essential to know the differences of group specific level of perceived integration for defining differential policy measures for an individual group. In support of the assessment process, Tinto (1987) suggested that an ''institutional assessment is a crucial pre-requisite for the establishment of institutional retention policy'' (p. 138). This study therefore, focuses on the application of the Tinto model to assess the differences of academic and social integration climate as perceived by the students between subject groups at various stages of their undergraduate studies.

Method

Population and sampling

The population of this study was 2400 full-time undergraduate students, enrolled in third term of 2002, at the University of Papua New Guinea. A stratified sampling procedure was followed to conduct the survey. The total population was divided into five stratums according to the year of studies. The sample was selected using proportional

allocation technique. Based on the selected sample, 1000 question-naires were distributed among the selected students. Five-hundred and sixteen useable completed questionnaires were received and used for this study.

Instrument

In order to assess the perceived current academic and social integration climate, a questionnaire was developed; modelled after that of Pasca-rella and Terenzini (1978, 1979, 1980), Pascarella and Chapman (1983), Bean (1980). New items were included and statements were reframed to make the instrument more contextual.

The integration criteria (dependent variables) were grouped in con-ceptual categories of academic and social integration. Academic inte-gration consisted of two criteria: (a) academic staff concern for students' development and learning and (b) students' informal contact with aca-demic staff on academic matters, each having five items. Social integra-tion consisted of three criteria: (c) informal social contact with academic staff, (d) extracurricular activities and (e) peer group interaction having 14 items. Respondents were asked to what extent they agreed or dis-agreed on a continuum of five possible responses for the current situation (strongly disagree, disagree, neutral, agree, and strongly agree).

Data analysis

The SPSS package was utilised to conduct the reliability analysis of the instrument. Analyses were conducted for each of the five integration dimensions and for the overall scale (total instrument).

Alpha reliability coefficients are reported in the following Table (1). The alpha coefficients ranged from 0.70 to 0.75 for the instrument, with overall reliability of 0.91. Alpha coefficients for all dimensions on the scales were high and were judged to be adequate for using the scales in further analysis.

The data was further analysed using the principal component form of factor analysis (PCA) as implemented in SPSS, Version 6.1. In recom-mending PCA as the preferred option, Tabachnick and Fidel (1989) stated that

Table 1. Reliability analysis of academic and social integration instrument

Academic and Social Integration Dimensions	Item no.	Alpha coefficient	N
Academic concern for students development and learning	1–5	0.72	516
Informal contact with academic on academic matters	6–10	0.75	516
Informal social contact with academic staff	11–14	0.73	516
Extracurricular activities	15–17	0.71	516
Peer group interaction	18–24	0.70	516
Overall	1–24	0.91	

"Principal component analysis (PCA) is the solution of choice for the researcher who is primarily interested in reducing a large number of variables down to a smaller number of components. PCA is also recommended as the first step in factor analysis where it reveals a great deal of probable number and nature of factors" (p 626).

The 'eigenvalue greater than 1' criterion was employed to determine the number of factors to extract, and the factors were rotated to improve the variable loading, using SPSS's OBLIMIM form of oblique rotation (Tabachnick et al. 1989). The stability of the factor structure was tested by randomly dividing the data set into two halves and repeating the analysis on each half. The derived factor structures were then compared for similarity. This procedure was repeated five times, and only minor movements of items between factors were found.

Looking first at the responses, SPSS reported a Kaiser–Meyer–Olkin (KMO) index of 0.88 as a measure of sampling adequacy and an associated Bartlett chi squared value of 3591.24 ($p < 0.0001$), thereby indicating that the correlation matrix was factorable. The factor analysis yielded a solution of five factors with eigenvalues ranging from 6.10 to 1.15. Rotated factor loading matrix is provided in Appendix 1.

Results and discussion

The factor analysis shows that all 24 items loading ranged from 0.44 to 0.84 except for one item, which had loading of 0.35. Similar studies by Pascarella and Terenzini (1980) excluded all items, which had failed to

load 0.35 and above. Thus all 24 items were included for computation for scale score. The procedure extracted five factors, which accounted for 52.2% of the variance in the factor matrix.

The rotated factor loading analysis on empirical data resulted in regrouping of items that were clustered together to explain specific integration factors related to academic and social integration. Five measures of 'academic staff concerns with student development and teaching' and two measures of 'informal contact with academic staff on academic matters' was loaded with one factor namely 'academic staff concerns for students' development and learning'. Similarly, three measures of 'informal contact with academic staff on academic matters' and 'four measures of informal social contact with academic staff' required regrouping into one factor: 'informal contact with academic staff'. Six measures of peer group interactions of the survey instrument were clustered into two factors. One factor explained the interpersonal or person to person interaction, and the other one explained the group interaction on socialisation processes. It was evident that a factor explaining the person to person student interaction had to be added to explain the integration dimension meaningfully. 24 items, which according to factor analysis clustered against each of the following five factors, were regrouped for data analysis.

Factor 1: Informal contact with academic staff
Factor 2: Academic staff concern for students' development and
        learning
Factor 3: Peer interaction
Factor 4: Extracurricular activities
Factor 5: Peer group interactions.

Factor (2) 'academic staff concern for students' development and learning' represents academic integration while the remaining factors represent the social integration.

This study focuses on the applicability of Tinto Model in the context of a developing nation in explaining its construct validity in respect to compensatory relationship between academic and social integration. A factor correlation matrix was conducted to explore the compensatory relationship between the academic and social integration.

The factor correlation matrix (Table 2) shows that there was a moderate negative correlation between the factors, 'academic staff concern for student development and learning', and 'informal contact with academic staff' (−0.37). On the other hand, there appears to be a strong negative correlation between the factors, 'academic staff concern

Table 2. Factor correlation matrix

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Factor 1					
Factor 2	−0.37				
Factor 3	0.07	−0.14			
Factor 4	0.46	−0.57	0.12		
Factor 5	−0.42	0.49	−0.36	−0.12	

for student development and learning', and 'extracurricular activities'(−0.57). These indicate that students who had low ratings for either 'informal contact with academic staff' or 'extracurricular activity' appeared to attach high ratings for 'academic staff concern for students development and learning' or vice versa. These results validate the construct of the Tinto model, which suggests the compensatory relationship between the academic and social integration. In case of less integration in the social domain of the University, which is represented by 'informal contact with academic staff' and 'extracurricular activities', students might have persisted due to a high degree of academic integration that is measured by 'academic staff concern for student development and learning'. The similar situation might have prevailed in the case of less academic integration.

In order to answer the basic research question of the degree of integration of students in various subject areas at different levels of their undergraduate studies, a series of multivariate analysis of variance (MANOVA) were conducted using the five factors extracted by factor analysis. The independent variables used in the MANOVA were gender, year of studies and subject area of studies. A full interaction model was specified and computed using the SUPERANOVA software package. In order to meet the cell frequency criterion in the design matrix for MANOVA (Tabachnick et al. 1989), the year variable was collapsed unto two categories: 1 represented years 1 and 2 (junior) students; and 2 represented years 3, 4 and 5 (senior) students. Similarly, the subject variable was collapsed so that subject area 5 (Health Sciences) and 6 (Medicine) formed one category.

Turning to the MANOVA for the factor scores, the MANOVA summary table for all effects is given below. Only the Wilks Lambda statistics are shown in the table, but they are consistent with the Hotelling Lawley Trace and Pillai Trace statistics in every case.

Table 3. MANOVA summary table

Effect	Value	F-Value	NUMDF	DEMDF	p-Value
G*Y*S	0.96	0.77	20.00	1632.72	0.74
Y*S	0.94	1.54	20.00	1632.72	0.05*
S*G	0.96	1.00	20.00	1632.72	0.45
G*Y	0.99	0.31	5.00	492.00	0.90
Y	0.99	0.92	5.00	492.00	0.46
S	0.86	3.59	20.00	1632.72	0.01*
G	0.98	1.73	5.00	492.00	0.12

Note: "G" = gender; "Y" = year of studies; "S" = subject area of studies;
Value = value refers to the Wiks Lambda value.

It is evident from (Table 3) that the MANOVA on the composite variable revealed a significant (p = or < 0.05) effect only for the subject independent variable, and the interaction between subject and year.

Interaction effect of subject by year: The univariate summary table for the subject by year effect is shown below.

Table 4. Subject by year UNIVARIATE summary

Dependent variable	df	Sum of squares	Mean squares	F-Value	p-Value
Factor 1	4	3.22	0.80	0.86	0.48
Factor 2	4	4.73	1.18	1.29	0.27
Factor 3	4	9.71	2.42	2.44	0.04*
Factor 4	4	9.87	2.46	2.51	0.04*
Factor 5	4	2.33	0.58	0.58	0.67

Table 4 shows that the subject by year effect was restricted to factors 3 and 4. Figure 1 below shows the effect for factor 3.

On factor three, which represents the measure of peer interactions or person to person relationships, students' perceptions in general appeared to be higher for senior students (except creative arts) than for their junior counterparts. This indicates that the peer interaction is more important for senior students than for the junior ones. This may be interpreted as junior students were supported by fellow senior student groups from their own tribes or region. Along with progress with their studies, students find their own way to cross the regional group barrier
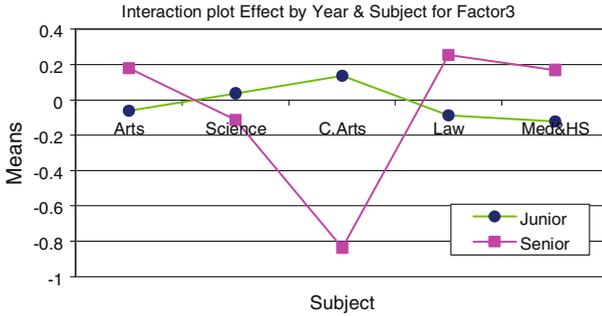
Figure 1. Interaction plot effect by year and subject are of studies for peer interpersonal relationship dimension.

and make friendships with class mates and a cross section of other students through student bodies, and by associating with other students developing a similar professional identity.

The interaction effects of year and subject show that the peer interactions dimension was perceived as more important for the junior creative arts students than for their senior counterparts. Contrary to this, the same dimension was more important for the senior students of law and medicine plus health science students, than for their junior counterparts. The differences between the junior and senior creative arts students may be attributed to the methods of teaching and learning in this area. Though the junior students of creative arts were supported by regional groups from their own districts, the teaching and learning methods required them to interact person to person with other students during attendance in practices and performances. Gradual movement of the students to upper classes required them to be more involved in group practices and performances. As a result, senior students attached more importance to group interactions, while junior students attached more importance to interpersonal interaction.

Students in law and medicine plus health science subjects receive professional training to qualify them for recognition by professional bodies. Junior students have less understanding about their professional identity, which encourages them to prefer social interaction with regional or district groups. However along with their movement to senior classes, students gradually sought the interactions based on professional identity. As a result, senior students found it useful and comfortable for academic and social integration to interact with fellow students in the same discipline and profession.
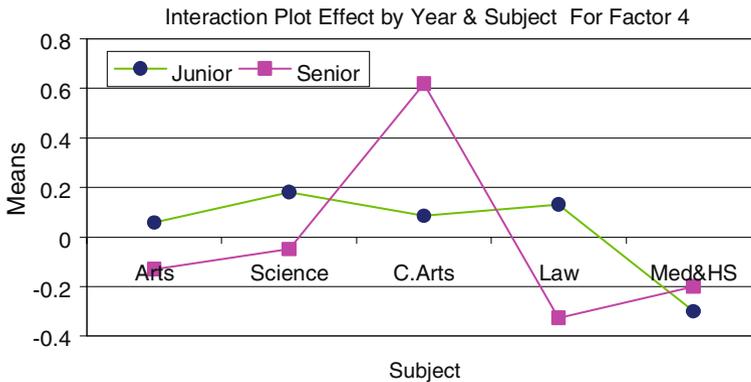
Figure 2. Interaction plot effect by year and subject area for extracurricular activities dimension (factor 4).

Figure 2 indicates that extracurricular activities were in general more important for the junior students than for their senior counterparts in most of the subject areas. First year and second year students found it important to participate in clubs, organizations, cultural and sporting events, and public lecturers for integration into the social system of the University. The student program structure gradually narrows to focus specialization in particular subject areas, which in turn requires interaction with fellow students in the same professional areas. As a result, senior students appeared to attach less importance to the extracurricular activities than do their junior counterparts.

By subject areas of studies, junior students of arts, science and law had higher ratings for extracurricular activities than did their senior counterparts. This may be attributed to the academic program structure, which requires the first year and second year students to attend a liberal program of studies while senior students gradually narrowed their focus to particular subjects of specialisation. As a result, the importance of participating in extracurricular activities gradually diminishes as students' progress to higher classes.

In the case of creative arts subject areas, senior students attached more importance to extracurricular activities than their junior counterparts. This may again be attributable to their academic program structure. Creative arts students are required to allocate more time to group practice and performance, which increases with progression to senior years. Though attendance to practice, performance and pro-

duction workshops is part of their curriculum, students may treat these as extracurricular activities. Thus the definition and scope of extracurricular activities sometimes depends on the method of teaching and learning in particular subject areas.

There were small differences between junior and senior students in medicine and health sciences subject areas. In addition, the figure indicates that students in these subject areas attached low appreciation of extracurricular activities. This is probably because the professional needs and limited time frame available for the program of studies required students to pursue tight and rigorous study habits including attendance at practical and clinical sessions. As a result, students may have found it difficult to allocate more time for extracurricular activities.

Main effect of subject area of studies

The univariate summary table for the subject effect is shown below. It is evident from the Table 5 that there are significant differences between the perceptions of subject groups on factor 1 (informal contact with academic staff on personal matters and broader issues), factor 2 (academic staff concern for student development and learning) and factor 4 (extracurricular activities).

Charts showing the difference of perceptions by subject area of studies are presented in the following figures. As shown in the Figure 3, student perceptions on informal contact with academic staff (factor 1), arts, science and law students had low appreciation for the current integration effects, while the creative arts students had the highest appreciation followed by students of medicine and

Table 5. UNIVARIATE summary by subject

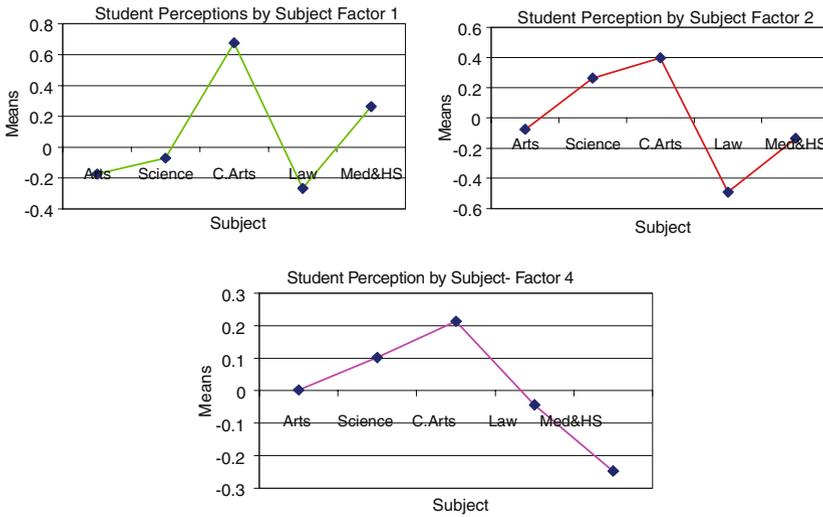| Dependent variable	df	Sum of squares	Mean squares	F-Value	p-Value
Factor 1	4	21.72	5.43	5.82	0.01*
Factor 2	4	21.94	5.23	5.73	0.02*
Factor 3	4	6.32	1.58	1.59	0.17
Factor 4	4	13.11	3.28	3.34	0.01*
Factor 5	4	5.68	1.42	1.41	0.22

Figure 3. Interaction effects by subject area of studies.

health sciences. In respect of academic staff concern for student development and learning (factor 2), law students expressed the lowest negative appreciation followed by arts and medicine plus health sciences.

Creative arts students expressed the highest positive appreciation followed by science students. For the extracurricular factor (factor 4), creative arts students expressed the highest appreciation, which was followed by science and arts students, while medicine plus health sciences students had the lowest negative appreciation for the University's efforts followed by law students.

The creative arts students had the highest appreciation in the three different factors that may be attributable to the methods of teaching and learning, requiring interaction between academic staff and students during practice and demonstration sessions. Law students had low appreciation on all three factors that may be due to more emphasis being given in that area to independent study methods. Though medicine and health students teaching and learning methods involved maximum supervision of the academic staff, their perceptions on 'academic staff concern for student development and teaching' and 'academic staff informal contact' appeared very low. Lack of adequate student amenities at Taurama Campus might be the reason for

medical and health sciences students' low ratings on the extracurricular activities factor.

Conclusion

The primary purpose of this study was to examine the applicability of Tinto's model to explore the compensatory relationship between academic and social integration, and also to assess the varied level of academic and social integration between junior and senior undergraduate students by subject area of studies. One important outcome of the study was testing the validity of the Tinto model in identifying compensatory relationship between academic and social integration. This study showed a strong negative relationship between academic and social integration, which indicates that less integration in the social domain of the university was compensated by higher academic integration leading to student persistence. Similarly, less academic integration might be compensated by higher social integration influencing students to continue study. These results indicate that the model, as operationalised in this study, indeed is applicable in different settings and environments like Papua New Guinea compared to its proven utility for researchers and administrators concerned about retention in developed countries.

This study found a significant interaction effect between year and subject area of studies. However, the subject by year effect was restricted to 'peer interactions' and 'extracurricular activities'.

The interaction plot effect by year and subject area of studies for peer interactions showed that student perception was higher for junior creative arts and science students than their senior counterparts. Contrary, students perception on the same dimension was higher for the senior arts, law and medicine plus health sciences students than their junior counterparts. The interaction plot effect by year and subject area for 'extracurricular activities' revealed that junior students of arts, science and law had higher ratings than their junior counterparts. Contrary, senior students of creative arts rated high for this dimension than their junior counterparts. There were small differences between the junior and senior students' ratings in medicine and health sciences.

The main effect of subject area of studies on integration dimensions revealed significant differences between the perceptions of subject group on 'informal contact with academic', 'academic concern for student development and learning' and extracurricular activities'.

The difference of interaction effect between senior and junior students of various subject areas of studies and main the effect of subject area on integration dimensions are attributable to the difference of students' background, needs, teaching and learning methods and their professional orientation.

It appears from the findings and conclusion of this research that students' integration in the academic and social system of the university leading to their persistence differs according to their subject areas of studies. Similarly factors influencing the students' academic and social integration leading to persistence differ according to their year of studies. These significant differences between different groups of students implied that general retention policy measures would not be effective to address the group specific problems of student retention. Thus higher education institutions must define retention policy measures according to the differing needs of specific groups. Consequently differing needs are identifiable through research on persistence.

In light of the findings of this study, it is suggested that institutions of higher education should develop a strategic retention policy for the institution as a whole. In addition, the lower administrative units like school/department should develop subject and year specific retention policy measures to address the problems and needs of specific group of students.

Findings of this research validated the concept of the Tinto's model in respect of compensatory relationship between academic and social integration leading to students' persistence. In addition, need for institution and group specific studies to assess the differences of social and academic integration leading to persistence was also validated by this research. It was also found that the concept of Tinto's model is applicable for conducting research on students' persistence in a university dominated by Melanesian culture in the South Pacific. The next step is to conduct research to explain the dropout decision in relation to the students' background, commitments and academic and social integration through application of Tinto model.

Appendix: Rotated factor loading matrix

Rotated factor loading matrix

Integration dimension/items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
(A) *Academic staff concern for students development and teaching*					
1. Attended departmental meetings	0.28	0.36*	-0.03	0.25	0.03
2. Genuinely concerned in my acad. work	0.23	0.71*	0.15	0.03	0.09
3. Willing to spend time outside class	0.37	0.58*	-0.01	0.07	0.06
4. Genuinely interested in teaching	0.07	0.73*	0.10	0.06	0.04
5. Interested in alleviate my aca. weakness	0.32	0.67*	0.02	0.08	0.10
(B) *Informal contact with academic staff on academic matters*					
6. Always available for obtaining information	0.35	0.59*	0.10	0.08	-0.99
7. Accessible to discuss matters of Intellect	0.46	0.51*	0.03	0.13	0.03
8. Positive influence on personal growth	0.53*	0.32	0.17	-0.03	-0.07
9. Accessible to discuss career goals	0.67*	0.29	0.01	0.06	0.02
10. I am satisfied with opportunities	0.63*	0.15	0.18	0.05	0.06
(C) *Informal social contact with academic staff*					
11. Accessible to discuss campus etc issue	0.71*	0.19	0.01	0.04	-0.01
12. Interested for socialisation	0.73*	0.03	0.01	0.08	0.22
13. Accessible to solve personal problems	0.60*	0.28	0.00	0.11	0.08
14. Involve to promote good relationship	0.50*	0.35	0.10	0.05	0.16

(D) *Extra curricular activities*					
15. Participation in clubs and organisations	−0.02	0.16	0.00	0.78*	0.14
16. Participate in sports and cultural events	0.06	0.05	0.06	0.84*	0.07
17. Participate in public lecturers seminars	0.22	−0.05	0.27	0.66*	−0.09
(E) *Peers grop group interactions*					
18. Stud. bodies and groups promote friendship	0.08	0.09	0.25	0.44*	0.41
19. Interpersonal relationship for personal growth	0.05	0.15	0.84*	0.09	0.10
20. Interpersonal relationship for intellectual growth	0.08	0.11	0.87*	0.07	0.09
21. Students helped in personal problems	0.07	0.02	0.66*	0.12	0.16
22. Alcohol consumption helpful for socialisation	0.22	−0.13	−0.02	−0.05	0.48*
23. Regional groups successful in socialisation	0.02	0.13	0.12	0.13	0.72*
23. Satisfied with socialisation with peer groups	−0.01	0.13	0.21	0.08	0.68*

*Indicate the factor on which the variable have the highest loading.

References

Baumgart, N.L. and Johnstone, J.N. (1977). 'Attrition at an Australian University: A case study', *Journal of Higher Education* XLVIII(5), 553–570.

Bean, J.P. (1980). 'Dropouts and Turnover: The synthesis and test of a causal model of student attrition', *Research in Higher Education* 12(2), 155–187.

Bean, J.P. and Kuh, G.D. (1984). 'The reciprocity between student–faculty informal contact and academic performance of university undergraduate students', *Research in Higher Education* 21(4), 461–477.

Bean, J.P. and Metzner, B.S. (1985). 'A conceptual model of non-traditional undergraduate student attrition', *Review of Educational Research* 55, 485–540.

Bean, J.P. and Metzner, B.S. (1987). 'The estimation of a conceptual model of non-traditional undergraduate student attrition', *Research in Higher Education* 27(1), 15–38.

Bers, T.H. and Smith, K.E. (1991). 'Persistence of community college students: The influence of student intent and academic and social integration', *Research in Higher Education* 32(5), 539–556.

Durkheim, E. (1951). Suicide, Translated by J.A. Spaulding and G. Simpson, Glencoe: The Free Press. Originally published as Le Suicide: Etude de sociology, Paris: Felix Alcan, 1897.

Eckland, B.K. (1964). 'A source of error in college attrition studies', *Sociology of Education* 38, 60–72.

Fox, R. (1986). 'Application of a conceptual model of college withdrawal to disadvantaged students', *American Educational Research Journal* 23, 415–425.

GOPNG (1990). *National Higher Education Plan* (NHEP), Commission for Higher Education, Port Moresby.

Iffert, R.E. (1958). 'Retention and withdrawal of college students', *Bulletin No. 1, Washington D.C.*: U.S.Office of Education.

Johnson, G.M. (1996). 'Faculty differences in university attrition: a comparison of the characteristics of arts, education and science students who withdraw from undergraduate programs', *Journal of Higher Education Policy and Management* 18(1), 75–91.

Johnson, R.H. (1980). 'The relationship of academic and social integration to student attrition – a study across institutions and institutional types'. *Unpublished doctoral dissertation, School of Education, The University of Michigan.*

Mannan, M.A. (1990). *Attrition study at UPNG*, UPNG Press.

Marsh, L.M. (1966). 'College dropout: A review', *Personnel and Guidance Journal* 44, 475–481.

Michaels, J. and Miethe, T. (1989). 'Academic effort and college grades', *Social Forces* 68, 309–319.

Moline, A.E. (1987). 'Financial aid and student persistence: an application of causal modelling', *Research in Higher Education* 26, 130–147.

Munro, B.H (1981). 'Dropouts from higher education: Path analysis of a national sample', *American Educational Research Journal* 18(2), 133–141.

Nelson, A.G. (1966). 'College characteristics associated with first year attrition', *Personnel and Guidance Journal* 44, 1046–1050.

Napoli, A.R and Wortman, P.M. (1996). 'A meta-analysis of the impact of academic and social integration on persistence of community college students', *Journal of Applied Research in the Community College* 4(1), 5–21.

Pascarella, E.T. and Chapman, D.W. (1983). 'A multi-institutional path analytic vali-
    dation of Tinto's Model of college withdrawal', *American Educational Research
    Journal* 20(1), 87–102.
Pascarella, E.T. and Terenzini, P.T. (1977). 'Patterns of student–faculty informal
    interaction beyond the classroom and voluntary first year attrition', *Journal of
    Higher Education* 48(5), 540–552.
Pascarella, E.T. and Terenzini, P.T. (1978). 'The Role of students' background and
    levels of academic and social integration in college attrition: A test of a model',
    *Paper presented to the Annual Conference of American Education Research Associ-
    ation*, Toronto, Canada, March.
Pascarella, E.T. and Terenzini, P.T. (1979). 'Interaction effects in Spady's and Tinto's
    Conceptual Models of college dropout', *Sociology of Education*, 52 (October), 197–
    210.
Pascarella, E.T. and Terenzini, P.T. (1980). 'Predicting first year persistence and vol-
    untary dropout decisions from a Theoretical Model', *The Journal of Higher Edu-
    cation* 51(1), 60–74.
Pascarella, E.T., Smart, J.C. and Ethington, C.A. (1986). 'Long-term persistence of two-
    year college students', *Research in Higher Education* 24(1), 47–71.
Scot, C., Burns, A. and Cooney, G. (1996). 'Reasons for discontinuing study: The case
    of mature age female students with children', *Higher Education* 31, 233–253.
Spady, W.G. (1970). 'Dropouts from higher education: An interdisciplinary review and
    synthesis', *Interchange* 1, 64–85.
Spady, W.G. (1971). 'Dropouts from higher education: Towards an Empirical Model',
    Interchange 2(3), 38–62.
Tabachnick, B.G. and Fidell, L.S. (1989). *Using Multivariate Statistics*. 2nd edition,
    New York: Harper Collins Publisher.
Terenzini, P.T and Wright, T.M. (1987). 'Influences on students' academic growth
    during four years of College', *Research in Higher Education* 26(2), 161–179.
Terenzini, P.T., Theophilides, C. and Lorang, W.G. (1984). 'Influences on students'
    perceptions of their academic skill development during college', *Journal of Higher
    Education* 55(5), 621–636.
Tinto, V. (1975). 'Dropout from higher education: A theoretical synthesis of recent
    research', *Review of Educational Research* 45(1), 89–122.
Tinto, V. (1982). 'Limits of Theory and Practice in on', *The Journal of Higher Education*
    53(6), 687–700.
Tinto, V. (1993). *Leaving College: Rethinking the Causes and Cures of Student Attrition*.
    2nd edition, Chicago: University of Chicago Press.
Westcott, E. (1995). 'Budget against student wastage', The Times Higher Education,
    October.