

# **A REVISED COURSE EXPERIENCE QUESTIONNAIRE FOR STUDENT EVALUATION OF UNIVERSITY COURSES**

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## **Abstract**

The Course Experience Questionnaire, used annually by Australian universities to measure graduate perceptions of courses, was revised. A Support and Resources sub-scale (12 items) was added to the original sub-scales (Good Teaching, Clear Goals, Good Assessment, Reasonable Workload, Generic Skills and Overall Satisfaction). All items were rewritten as Course Expectations (31 items) and, in direct correspondence, Course Experiences (31 items). An ordered response format (not Likert) covering units (subjects) studied was used. The convenience sample consisted of 404 third year students from an Australian university and the data were analyzed with a Rasch measurement model. The scale had good psychometric properties and the conceptual design was supported. When those items not fitting the model were deleted, expectations were easier than experiences. The scale indicates clearly those aspects which the university does well and those which the university needs to improve and performance indicators were calculated from the scale.

## **A REVISED COURSE EXPERIENCE QUESTIONNAIRE FOR STUDENT EVALUATION OF UNIVERSITY COURSES**

### **Introduction**

The 1998 Course Experience Questionnaire consists of 25 items in a Likert format (Likert, 1932) with five response categories (strongly disagree to strongly agree). It is used by most of the 37 universities in Australia to gather graduate perceptions of teaching and course quality about four months after graduation. The questionnaire is given out annually to all graduates (at 30 April 1998 for December 1997 graduates and at 31 October 1997 for June 1997 graduates), along with the Graduate Destination Survey, and the results are sent to the Graduate Careers Council of Australia who produce reports covering all the universities (Johnson, 1997; Johnson, Ainley & Long, 1996). It is used to measure graduates' perceptions of the quality of their completed courses (see the questionnaire and Johnson, 1997, p.3). The items are conceptualized from five aspects relating to course experiences and the learning environment. These are Good Teaching (7 items), Clear Goals and Standards (4 items), Appropriate Assessment (3 items), Appropriate Workload (4 items), and Generic Skills (6 items), and a single item on Overall Satisfaction. However, the items are not separated into the sub-scales for the graduates on the questionnaire.

The development of the Course Experience Questionnaire is given in Ainley and Long (1995, 1994), Johnson, (1997), Johnson, Ainley & Long (1996), and Ramsden (1991a,b). For recent commentary on the questionnaire, see Johnson (1997), Johnson, Ainley and Long (1996), and Wilson, Lizzio and Ramsden (1996), and for earlier development work see Ramsden (1991a,b), Linke (1991), Entwistle and Ramsden (1983), and Marton and Saljo (1976).

### **Problems with the Course Experience Questionnaire**

Seven aspects of the Course Experience Questionnaire are called into question. First, students (graduates) are asked to respond to items in a Likert format (strongly disagree to strongly agree) and apply this format across all units (subjects) in their course, globally. When they have had many lecturers and many units (subjects), some of whom (which) are bad and some of whom (which) are good, it is difficult for them to answer globally, and there is a consequent measurement problem for the researcher where the interpretation is unclear. Second, the response format contains a discontinuity at the undecided (middle) category. That is, the response measurement format is not ordered from low to high and those who are undecided, don't want to answer, are unclear or just neutral, will answer the middle category. This means there is a consequent interpretation problem. Third, the model does not contain items relating to the library, academic support, counseling and computing support. Since these are an important part of a student's course experience, items relating to these aspects ought to be included. Four, the Course Experience Questionnaire only measures student (graduate) perceptions of their courses (Course Experience Questionnaire, 1998). It is likely that student expectations of their courses influence their course experiences (perceptions) during their courses, so that both expectations and experiences ought to be measured at the same time. Five, graduates with a double major are asked to complete the 25 items twice, one for each major, viewed as a separate course. Since it is not always clear which units (subjects) are to be counted in each major, there is a measurement and interpretation problem. Six, the 25 items are not separated into their sub-scales so that it is not clear to the graduates what is being measured. Seven, the main analysis of the Course Experience Questionnaire is performed with traditional measurement programs and ordinal level scales. Modern measurement programs are now available to create interval level measures in which Course Expectations and Course Experiences can

be calibrated on the same interval level scale (Andrich, 1988a, 1988b; Andrich, Lyne, Sheridan & Luo, 1998; Rasch, 1960/1980).

Changes were made to the Course Experience Questionnaire to overcome the seven problems referred to above. The original five sub-scales (Good Teaching, Clear Goals, Good Assessment, Reasonable Workload and Generic Skills) were retained in the new design, and a sixth was added (Support and Resources). The original 25 items were rewritten and six extra items were added for the Support and Resources sub-scale. There are now 31 items relating to Course Expectations and, in direct correspondence, 31 items relating to Course Experiences (see the Appendix). The items were ordered under their respective sub-scale headings which makes it clear to the students what sub-scale is being measured. The response format was then changed in two ways. First, two columns were added for responses, one for Course Expectations and another for Course Experiences. Second, the response categories were changed to an ordered format to provide a better measurement structure: in all the units or nearly all the units, in most units, though not all units, in some units, but not most units and in no units or almost none. The data were analysed with a Rasch measurement model (Andrich, Lyne, Sheridan & Luo, 1998).

### **Conceptual framework**

It is assumed that there is an underlying trait that could be called Course Expectations. This trait would be exhibited as an attitude at the beginning of the course. The trait is related to six aspects associated with courses: Good Teaching, Clear Goals, Good Assessment, Reasonable Workload, Generic Skills and Support and Resources. Thus, a student's Course Experience is conceptualized, in part, as a Course Expectation derived from six aspects of courses and, in part, as a Course Experience derived from six aspects of courses.

It is expected that while students will have high expectations of universities, their experiences will be of a lower standard. That is, they will find the items easy in the expectation mode and more difficult in the experience mode. For example, it is theorized that students will expect teaching staff to work hard at making their subjects interesting (an easy item), but when they come to university they find that many subjects are presented in a boring way (a harder item). Similarly, students will expect teaching staff to put a lot of time into commenting on their work (easy but harder than the previous easy item), but when they come to university they find that many staff do not comment much on their work (hard and harder than the previous hard item). It is theorized that this pattern of easy expectation items, which are harder in experience, will occur for all items, provided they fit the model and can be placed on the scale. This is in line with the theory that attitudes influence behaviour (see Ajzen, 1989; Fishbein & Ajzen, 1975; and Waugh, 1998, re university student attitudes and behaviour towards studying).

### **Aims**

The present study aimed to create an interval level scale for the Revised Course Experience Questionnaire, analyze its psychometric properties using a modern measurement model, the Extended Logistic Model of Rasch (Andrich, 1988a, 1988b; Rasch, 1980), and investigate the conceptual design of the Questionnaire.

### **Sample and Administration**

The sample consisted of 404 third year students from an Australian university and is basically a convenience sample. There are 65 (16.1%) undergraduates studying in Business, 160 (39.6%) in Education; 123 (30.4%) in Nursing; and 56 (13.9%) in Psychology.

The questionnaires were administered at the beginning or end of a lecture, with the permission of the lecturers. The purpose of the questionnaire and the study were explained briefly to the students. It was pointed out that Course Expectations and corresponding Course Experiences were required for the six sub-scales. The questionnaires were anonymous and only grouped data would be reported. Generally, they took 10-15 minutes to complete.

## **Measurement**

Seven measurement criteria have been set out by Wright & Masters (1981) for creating a scale that measures a variable. They are, first, an evaluation of whether each item functions as intended; second, an estimation of the relative position (difficulty) of each valid item along the scale that is the same for all persons; third, an evaluation of whether each person's responses form a valid response pattern; four, an estimation of each person's relative score (attitude or achievement) on the scale; five, the person scores and the item scores must fit together on a common scale defined by the items and they must share a constant interval from one end of the scale to the other so that their numerical values mark off the scale in a linear way; six, the numerical values should be accompanied by standard errors which indicate the precision of the measurements on the scale; and seven, the items should remain similar in their function and meaning from person to person and group to group so that they are seen as stable and useful measures. These criteria are used in creating a scale of student approaches to studying.

## **Measurement Model**

The Extended Logistic Model of Rasch (Andrich, 1988a, 1988b; Rasch, 1980/1960) is used with the computer program Rasch Unidimensional Measurement Models (RUMM) (Andrich, Lyne, Sheridan & Luo, 1998) to analyse the data. This model unifies the Thurstone goal of item scaling with extended response categories for items measuring, for example, Course Expectations and Course Experiences, which are applicable to this study. Item difficulties and person measures are placed on the same scale. The Rasch method produces scale-free person measures and sample-free item difficulties (Andrich, 1988b; Wright & Masters, 1982). That is, the differences between pairs of person measures and pairs of item difficulties are expected to be sample independent.

The zero point on the scale does not represent zero expectation or experience. It is an artificial point representing the mean of the item difficulties, calibrated to be zero. It is possible to calibrate a true zero point, if it can be shown that an item represents zero expectation (or experience). There is no true zero point in the present study.

The RUMM program (1998) parameterizes an ordered threshold structure, corresponding with the ordered response categories of the items. The thresholds are boundaries located between the response categories and are related to the change in probability of responses occurring in the two categories separated by the threshold. A special feature of this version of the RUMM program is that the thresholds are re-parameterized to create an ordered set of parameters which are directly related to the Guttman principal components. With four categories, three item parameters are estimated: location or difficulty ( $d$ ), scale ( $q$ ) and skewness ( $h$ ). The location specifies the average difficulty of the item on the measurement continuum. The scale specifies the average spread of the thresholds of an item on the measurement continuum. The scale defines the unit of measurement for the item and, ideally, all items constituting the measure should have the same scale value. The skewness specifies the degree of modality associated with the responses across the item categories. A fourth parameter, kurtosis ( $y$ ) can be added if there are five response categories.

The model takes the general form below:

$$\Pr \{X=x; b_n, d_i, t_{ki}\} = \exp \{x(b_n - d_i) - \sum_{k=1}^m t_{ki}\} / g_{ni}$$

where:

1. Person n with attitude/behaviour  $b_n$  responds to item i of difficulty  $d_i$ ;
2. There are m ordered thresholds  $t_{ki}$  for  $k=1$ , to m on the measurement scale;
3. the score  $x \in \{0, 1, 2, \dots, m\}$ ;
4. The normalising factor is

$$g_{ni} = 1 + \sum_{k=1}^m \{\exp k(b_n - d_i) - \sum_{j=1}^k t_{ji}\};$$

5. The constraints  $\sum_{i=1}^I d_i = 0.0$  and  $\sum_{k=1}^m \sum_{i=1}^I t_{ki} = 0.0$  are imposed;
6. The category coefficient for score x is defined as

$$k_{xi} = - \sum_{k=1}^x t_{ki} \text{ with } k_{0i} = 0.$$

The re-parameterization of the thresholds takes the general form:

$$\Pr \{x; b, d, q, h, y\} = 1/g \exp \{-xd + x(m-x)q + x(m-x)(2x-m)h + x(m-x)(5x^2 - 5xm + m + 1)y + xb\}$$

The RUMM program substitutes the parameter estimates back into the model and examines the difference between the expected values predicted from the model and the observed values using two tests of fit: one is the item-trait interaction and the second is the item-person interaction.

The item-trait test of fit (a chi-square) examines the consistency of the item parameters across the person estimates for each item and data are combined across all items to give an overall test of fit. The latter shows the collective agreement for all items across persons of differing receptivity.

The item-person test of fit examines both the response pattern of persons across items and for items across persons. It examines the residual between the expected estimate and the actual values for each person-item summed over all items for each person and summed over all persons for each item. The fit statistics approximate a t distribution with a mean of zero and a standard deviation of one. Negative values indicate a response pattern that fits the model too closely (probably because dependencies are present, see Andrich, 1985) and positive values indicate a poor fit to the model (probably because 'noise' or other measures are present).

## Results

The results are set out in one Figure and four tables. Figure 1 shows the graph of Course Experience measures and item difficulties on the same scale in logits. Table 1 shows item-student interaction and item-trait interaction (summary statistics) data. Table 2 shows the threshold values for the response categories of the 45 items forming the scale. Table 3

shows, in probability order, the location on the continuum, fit to the model and probability of fit to the model for the 45 items forming the scale. Table 4 shows the location, scale and skewness values for 45 items forming the scale.

### **Psychometric characteristics of the New Course Experience scale**

The Index of Person Separability for the 45 item scale is 0.876 (see Table 1). This means that the student measures are well separated along the scale, within the measurement errors. The threshold values are ordered from low to high indicating that the students have answered the response categories consistently, except for two items whose category responses are only slightly disordered (41 and 51)(see Table 2). The person-trait tests-of-fit indicate that the students are responding to items of different difficulty consistently across a range of item difficulties (see Table 1). That is, there are consistent and logical student and item response patterns, with the items and ordered response format used. The item-trait interaction test-of-fit (see Table 1) indicates that the values of the item difficulties are strongly consistent across a range of student measures. Thus, there is good consistency of teacher and item response patterns and a good fit to the model (see Table 3). These data indicate that the errors are small and that the power of the tests of fit are good.

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Place Tables 1 and 2 about here

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However, there is one problem area and this involves the scale values. The scale values for each item (observed average half threshold distance) vary too much (from 1.193 to 0.153 logits, see Table 4). In an ideal scale, these values should be equal, within the error measurement, as they define the unit of measurement. The variation probably arises because a few items are measuring some unknown aspects, as well as Course Experience (indicated by the positive test-of-fit for items in Table 1).

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Place Tables 3 and 4 about here

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### **Meaning of the New Course Experience Scale**

The 45 items that make up the variable, Course Experience, are conceptualized from six aspects of the learning environment and course experiences. These six aspects are confirmed as contributing to the variable. The 45 items define the variable. They have good content validity and they are derived from a conceptual framework based on previous research and theory. This, together with the data relating to reliability and fit to the measurement model, is strong evidence for the validity of the variable. This means that the students' responses to the 45 items are related sufficiently well to represent the variable Course Experiences.



## Discussion

### Interpreting the Scale

Items at the easy end of the scale (for example, items 61,53,33,29,51 & 11, see the appendix) are answered in agreement by nearly all the students. This means, for example, that students found it easy to say that they expected to be satisfied with the quality of the units (subjects) in their courses (item 61); easy to say that they expected to be satisfied with the quality of their lecture rooms and laboratories (item 53); easy to say that they expected to be able to cope with the pressure of the deadlines for assignments and examinations (item 33); easy to say that they expected the workload to be fair and reasonable (item 29); and easy to say that they expected the teaching staff to work hard at making their subjects interesting (item 11). All these are Course Expectations (attitudes).

Items at the hard end of the scale (for example, items 58,2,4,6,8,12 & 52, see the appendix) are only answered in agreement by those students who have high Course Experience measures. Students whose Course Experiences fall at the easy end of the scale would not be able to answer in agreement with the hard items (see Figure 1). This means, for example, that many students experienced overall dissatisfaction with the quality of units in their course (item 62); that many students failed to be motivated by teaching staff to do their best work (item 2); that many students experienced staff who did not put much time into commenting on their work (item 4); that many students experienced staff who did not make an effort to understand the difficulties that they were having with their work (item 6); that many students experienced teaching staff who did not give them helpful feedback on how they were going (item 8); and that many students experienced teaching staff who did not work hard at making their subjects interesting (item 12).

### Relationship between Expectations and Experiences

An interesting feature of this scale concerns the relationship between expectations (attitudes) and experiences. When all the items that do not fit the model are deleted, expectations are easier than their corresponding experiences (see the appendix). For example, students expected that they would easily be satisfied with the quality of the units (subjects) in their course, but the experience of many was that it was hard to be satisfied (items 61/62). Most students expected that they would easily discover what was required of them in their course, but many found it very much harder in practice to do so (items 17/18). Most students expected to feel confident about tackling unfamiliar problems as a result of their course, but found that their course experiences did not help them to do so (items 43/44).

### Improvements for the University

The information from this scale leads directly to advice that can be given to university administrators and lecturers about how to improve student experiences in their courses. This advice relates to the six sub-scales: Good Teaching, Clear Goals, Good Assessment, Reasonable Workload, Generic Skills, and Support and Resources. It is only applicable to the University where the data were collected and comes from an examination of those items which have positive logit values (those that students find to be difficult on the scale).

For Good Teaching, five of the six aspects (items 2,4,6,8 & 12) were in need of substantial improvement. That is, lecturing staff in all units surveyed need to improve their motivation, comments on student work, understanding of student difficulties, provision of helpful feedback and interest in their subjects. For Clear Goals, there was a clear need to improve explanations of what was required and provide clear goals. For Good Assessment,

improvements needed to be made in testing understandings rather than memorisation and theories rather than facts. For Reasonable Workload, students need to be given more time to understand what they are required to learn and make the workload more fair and reasonable. For Generic Skills, students need to be given more practice and skills at tackling unfamiliar problems. For Support and Resources, the university needs to improve the quality of its library resources, the quality of its computing resources and, most importantly, the student services including enrolment and timetabling.

### Aspects done well at the University

There are four items which are easy (items 14,28,42&54). They indicate aspects which students experience as being done well at the university where the data were collected. These are that students know the standard of work required in their units (subjects), that they need more than a good memory to do well, that they develop ability to work as a team member, and that good lecture rooms and laboratories are provided.

### Non-Fitting Items

Seventeen items did not fit the model; 16 were from Course Expectations (items 1,5,7,9,13,19,21,23,27,31,35,45,49,55,57, & 59) and 1 was from Course Experiences (item 60). The one non-fitting item from Course Experiences related to satisfaction with counselling support. Relatively few students use counseling and hence many could not answer this item. It can be deleted. The non-fitting items in Course Expectations did not fit the model because students with different scale measures could not agree as to their difficulty on the scale and the fit statistics support this. For example (item 1), some students expect staff to motivate them (easy item for them) and some say that motivation is up to the individual (hard item for them). Some students expect to be able to comprehend the large amounts of material to be learned (item 35, easy for them) and others expect that at university they will not be able to comprehend all the material (hard item for them).

That the 16 items on Course Expectations do not fit the model, yet all the items on Course Experiences fit the model, supports the validity of the use of the Rasch measurement model. Changing the response categories from the Likert type (where interpretation is unclear when applied to many units or subjects) to an ordered one involving the units also supports the use of the Rasch model. In contrast, a previous study of the Course Experience Questionnaire showed that seven items did not fit the model with the Likert response format (Waugh, 1998). Furthermore, the Rasch model helps to explain why items do not fit the model and it also helps in developing items which are more likely to fit the model.

### **Setting up Performance Indicators**

Universities and the Department of Employment, Education and Youth Affairs (Australian Government) develop performance indicators from the Course Experience Questionnaire, measured in the traditional way, by just adding up the raw numbers (ranks) and treating them as though they are a proper measure (scale). In terms of good measurement practice, this is questionable. So, can performance indicators be easily calculated with the new interval level measures and the answer is in the affirmative. Examples are taken for one Course Experience item in each of the sub-scales using Figure 1. Within Good Teaching, 98 students out of 404 (24%) have a measure equal to or greater than the difficulty of item 2 (difficulty +0.24 logits, teaching staff motivate me to do my best work). Within Clear Goals, 395 out of 404 (98%) have a measure equal to or greater than the difficulty of item 14 (difficulty -0.17 logits, I know the standard of work required). Within Good Assessment, 377 out of 404 (93%) have a measure equal to or greater than the difficulty of item 24 (difficulty +0.01 logits, the assessment methods require an in-depth understanding of the course



content). Within Reasonable Workload, only 41 out of 404 (10%) have a measure equal to or greater than item 32 (difficulty +0.47 logits, I'm given enough time to understand the things I have to learn). Within Generic Skills, 363 out of 404 (90%) have a measure equal to or greater than the difficulty of item 38 (difficulty +0.04 logits, I developed my problem solving skills) and within Support and Resources, 98 out of 404 (24%) had a measure equal to or greater than the difficulty of item 58 (difficulty +0.24 logits, I was satisfied with support from Student Services, regarding enrolment and timetabling). If data were available from other universities, similar performance indicators could be calculated and compared on the same interval scale.

## Conclusion

The Extended Logistic Model of Rasch was useful in creating a scale of Course Experiences and for investigating the psychometric properties of the scale. The analysis confirms the conceptual design of student course experiences as involving Course Expectations and Course Experiences within six aspects (Good Teaching, Clear Goals, Good Assessment, Reasonable Workload, Generic Skills and Support and Resources). The analysis also leads to suggestions on how to improve University performance by focusing on the difficult items which are not being addressed well and by calculating performance indicators.

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## Appendix

Dear Student

I am conducting a research project on students expectations and experiences in university courses. I want to find out both **your expectations at the beginning of your course and your experiences during the course**.

You are asked to complete the attached questionnaire. It contains 31 statements covering 6 aspects. These relate to Good Teaching, Clear Goals, Good Assessment, Reasonable Workload, Generic Skills and Support Facilities. It takes about 10 minutes to complete.

The purpose of the research is to create a measuring instrument of student expectations and experiences that can be used by others and to find out about student attitudes and experiences to help the university improve.

It is expected that this research will benefit the university, lecturers, students, student advisors and researchers studying reform and improvement.

Participation is voluntary and you can pull out at any time without prejudice. Your participation has nothing to do with any formal or informal assessment in your university courses.

No names are required on the questionnaire and individuals remain anonymous.

The research results will be published without the names of students or their universities, as these are not recorded on the questionnaire.

Thank you for your cooperation and participation. It is appreciated.

Your consent to complete the questionnaire is given on the conditions mentioned above.

## QUESTIONNAIRE: EXPECTATIONS AND EXPERIENCES IN UNIVERSITY COURSES

Please rate the 31 statements, in relation to all the units (subjects) studied in your course, according to the following response format. Place a number corresponding to your **expectation (at the beginning of your course)** and your **experiences (during your course)** on the appropriate line opposite each statement:

**In all the units (subjects) or nearly all the units put 3**

**In most units (subjects) though not all units put 2**

**In some units (subjects) but not most units put 1**

**In no units (subjects) or almost none put 0**

Example

If your expectation, at the beginning of your course, was to know the standard of work required in all your units, put 3 and, if you only experienced this in some units, put 1.

Item 7. Know the standard of work required in all units 3 1

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**Item no. Item wording Expectation Experiences**

**at the during**

**beginning the course**

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### **Sub-Scale: Good Teaching (6 items)**

1/2 I expected teaching staff to motivate me to do my best work. No fit +1.224

3/4 I expected staff to put a lot of time into commenting on my work. -0.076 +1.013

5/6 I expected staff to make a real effort to understand difficulties I might be having with my work. No fit +1.040

7/8 I expected teaching staff to give me helpful feedback on how I was going. No fit +0.789

9/10 I expected my lecturers to be good at explaining

things. No fit +0.098

11/12 I expected the teaching staff to work hard at making  
their subjects interesting. -0.756 +0.710

**Sub-Scale: Clear Goals (4 items)**

13/14 I expected to know the standard of work required No fit -0.168

15/16 I expected to have a clear idea of where I was going  
and what was expected of me. -0.696 +0.197

17/18 I expected that I would easily discover what was  
required of me. -0.647 +0.397

19/20 I expected lecturing staff to make it clear right  
from the start what they expected from students. No fit +0.291

**Sub-Scale: Good Assessment (4 items)**

21/22 I expected to be tested more on what I understood  
than what I memorised. No fit +0.733

23/24 I expected the assessment methods employed to require  
an in-depth understanding of the course content. No fit +0.006

25/26 I expected teaching staff to ask me more about  
theories and understandings than about facts. +0.060 +0.216

27/28 I expected that I would need more than a good  
memory to do well. No fit -0.080

**Sub-Scale: Reasonable Workload (4 items)**

29/30 I expected the workload would be fair and reasonable. -0.867 +0.242

31/32 I expected to be given enough time to understand  
the things that I had to learn. No fit +0.467

33/34 I expected that I would be able to cope with the  
pressure of the dead lines for assignments and exams. -1.313 +0.032

35/36 I expected that I would be able to comprehend the  
the large amounts of material to be learned. No fit +0.096

**In all the units (subjects) or nearly all the units put 3**

**In most units (subjects) though not all units put 2**

**In some units (subjects) but not most units put 1**

**In no units (subjects) or almost none put 0**

-----  
Item No. Item wording **Expectation Experiences**

**at the during**

**beginning the course**  
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**Sub-Scale: Generic Skills (6 items)**

37/38 I expected to develop my problem-solving skills. -0.484 +0.042

39/40 I expected to sharpen my analytic skills. -0.671 +0.082

41/42 I expected to develop my ability to work as a  
team member. -0.002 -0.101

43/44 I expected to learn to feel confident about tackling  
unfamiliar problems. -0.403 +0.283

45/46 I expected to improve my written communication skills No fit +0.016

47/48 I expected to develop my ability to plan my own work.-0.509 +0.017

**Sub-Scale: Support and Resources (6 items)**

49/50 I expected to be satisfied with the quality of the  
library resources. No fit +0.674

51/52 I expected to be satisfied with the quality of the



computing facilities. -0.735 +0.694

53/54 I expected to be satisfied with the quality of the lecture rooms and laboratories (where appropriate). -1.643 -0.391

55/56 I expected to be satisfied with the study facilities. No fit +0.203

57/58 I expected to be satisfied with support from Student Services, regarding enrolment and timetabling. No fit +1.237

59/60 I expected to be satisfied with counselling support (if and when it would be needed). No fit No fit

61/62 Overall, I expected to be satisfied with the quality of the units (subjects) in my course. -1.867 +0.451

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**What were the best aspects of your course?**

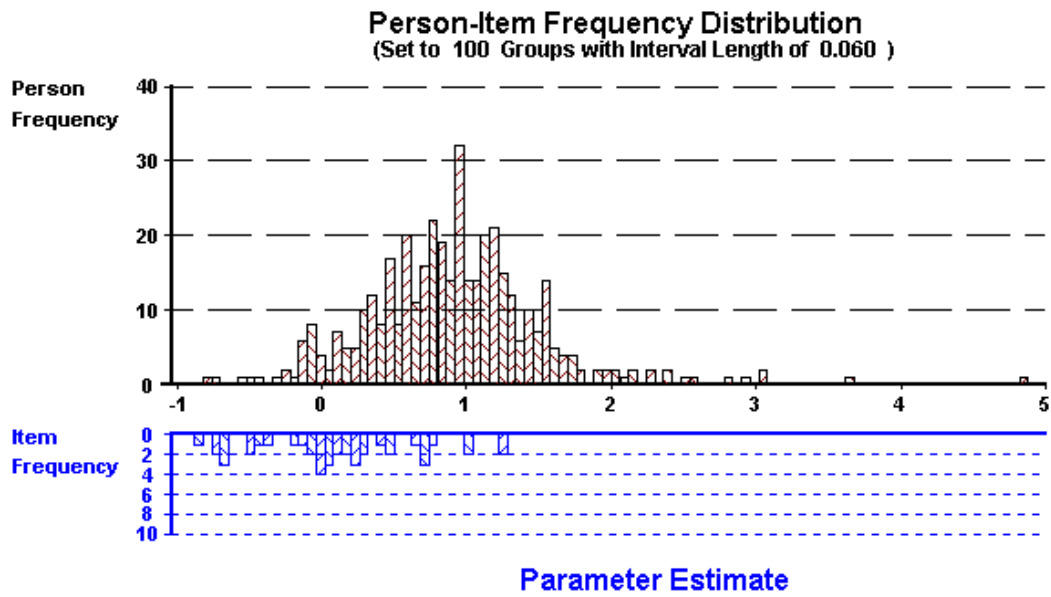
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**What aspects of your course are most in need of improvement?**

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FACULTY -----

**Thank you for your help. It is appreciated.**



**Figure 1 Student measures and item difficulties on the same scale**

Table 1 TEST-OF-FIT (summary statistics)

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Item-Person Interaction

Items Persons

Location Fit Location Fit

Mean 0.000 0.164 0.913 -0.323

SD 0.686 1.232 0.621 1.811

Complete data

degrees of freedom 43.67 392.04

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Item-Trait Interaction

Total Item Chi Sq 262.727

Person separation index 0.876

Total Degree Freedom 132.000

Total ChiSq Probability 0.000

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Test of Fit Power EXCELLENT

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Table 2. Threshold values

	1	2	3
Ex002 I002	-.492	.988	3.177
Ex003 I003	-.474	-.096	.341
Ex004 I004	-.525	.690	2.875
Ex006 I006	-.458	.921	2.655
Ex008 I008	-.602	.856	2.115
Ex010 I010	-2.373	.428	2.238
Ex011 I011	-1.037	-.825	-.405
Ex012 I012	-1.740	.923	2.946
Ex014 I014	-2.298	-.059	1.854
Ex015 I015	-.760	-.673	-.655
Ex016 I016	-1.503	.046	2.048
Ex017 I017	-1.633	-.522	.213
Ex018 I018	-1.678	.447	2.420
Ex020 I020	-1.433	.390	1.915
Ex022 I022	-.879	.755	2.322
Ex024 I024	-1.746	-.204	1.968
Ex025 I025	-.597	-.159	.937
Ex026 I026	-1.332	.082	1.898
Ex028 I028	-1.319	.253	.826
Ex029 I029	-1.213	-.952	-.436
Ex030 I030	-.641	-.259	1.626
Ex032 I032	-.751	.434	1.718
Ex033 I033	-2.957	-.898	-.083
Ex034 I034	-1.219	-.074	1.389
Ex036 I036	-1.156	-.231	1.974
Ex037 I037	-1.723	-.203	.474
Ex038 I038	-1.893	.058	1.961
Ex039 I039	-1.789	-.778	.554
Ex040 I040	-1.670	-.106	2.021
Ex041 I041	-.555	.285	.264
Ex042 I042	-1.363	.011	1.050
Ex043 I043	-1.098	-.767	.655
Ex044 I044	-1.246	.073	2.022

Ex046 I046 -1.081 -.147 1.277  
 Ex047 I047 -1.122 -.469 .063  
 Ex048 I048 -.949 -.242 1.242  
 Ex050 I050 -.361 .519 1.863  
 Ex051 I051 -1.153 -.508 -.543  
 Ex052 I052 -.508 .866 1.726  
 Ex053 I053 -3.160 -1.106 -.665  
 Ex054 I054 -1.825 -.551 1.201  
 Ex056 I056 -.770 -.108 1.487  
 Ex058 I058 .539 1.305 1.869  
 Ex061 I061 -2.989 -1.906 -.705  
 Ex062 I062 -1.693 -.032 3.078

Notes on Table 3

No. of Items = 45

No. of Persons = 404

Separation Index = 0.876

Table 3. INDIVIDUAL ITEM-FIT

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	Label	Location	SE	Fit	ChiSq	Probability
Ex028	I028	-0.080	0.06	-0.214	0.166	0.982
Ex032	I032	0.467	0.06	-0.228	0.399	0.939
Ex056	I056	0.203	0.07	-0.883	0.648	0.882
Ex034	I034	0.032	0.07	0.081	0.798	0.845
Ex004	I004	1.013	0.07	-0.212	1.036	0.786
Ex037	I037	-0.484	0.07	-0.092	1.197	0.746
Ex006	I006	1.040	0.07	-0.135	1.277	0.726
Ex008	I008	0.789	0.06	-0.761	1.303	0.720
Ex042	I042	-0.101	0.07	-0.245	1.345	0.710
Ex047	I047	-0.509	0.07	-0.522	1.747	0.615
Ex041	I041	-0.002	0.06	1.608	1.927	0.575
Ex030	I030	0.242	0.07	-0.107	1.984	0.563
Ex020	I020	0.291	0.07	-0.523	2.061	0.546
Ex024	I024	0.006	0.07	2.140	2.103	0.538
Ex002	I002	1.224	0.07	0.604	2.514	0.457
Ex043	I043	-0.403	0.07	0.032	2.613	0.438
Ex026	I026	0.216	0.07	1.117	3.523	0.297
Ex022	I022	0.733	0.07	2.248	3.678	0.277

Ex054	I054	-0.391	0.07	0.662	3.759	0.267
Ex061	I061	-1.867	0.12	-0.722	3.766	0.266
Ex033	I033	-1.313	0.09	0.504	3.850	0.256
Ex050	I050	0.674	0.06	1.055	4.367	0.201
Ex010	I010	0.098	0.07	-0.717	4.421	0.195
Ex053	I053	-1.643	0.10	-0.360	4.479	0.190
Ex058	I058	1.237	0.06	0.393	4.497	0.188
Ex039	I039	-0.671	0.08	-0.309	4.638	0.176
Ex052	I052	0.694	0.06	0.762	4.865	0.157
Ex016	I016	0.197	0.07	-1.097	4.942	0.151
Ex014	I014	-0.168	0.07	-0.837	5.041	0.143
Ex051	I051	-0.735	0.08	0.937	5.119	0.138
Ex046	I046	0.016	0.07	-0.961	6.031	0.083
Ex011	I011	-0.756	0.08	0.982	6.670	0.055
Ex040	I040	0.082	0.07	-0.933	6.697	0.054
Ex036	I036	0.196	0.07	-1.305	6.849	0.048
Ex029	I029	-0.867	0.09	0.428	7.357	0.032
Ex038	I038	0.042	0.07	1.734	8.534	0.007
Ex062	I062	0.451	0.08	-0.885	9.262	0.000
Ex025	I025	0.060	0.06	2.298	9.319	0.000
Ex018	I018	0.397	0.07	-1.242	10.466	0.000
Ex015	I015	-0.696	0.08	1.246	11.874	0.000
Ex012	I012	0.710	0.08	-1.032	12.539	0.000
Ex017	I017	-0.647	0.07	2.121	13.532	0.000
Ex044	I044	0.283	0.07	-1.190	13.750	0.000
Ex048	I048	0.017	0.07	-2.166	19.467	0.000
Ex003	I003	-0.076	0.06	4.116	36.320	0.000

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**Table 4 Location,Scale and Skewness Parameters**

Item	Code	Location		Scale		Skewness	
		Estm	SE	Estm	SE	Estm	SE
Ex002	I002	1.224	0.069	.917	0.065	.059	0.028
Ex003	I003	-.076	0.062	.204	0.052	.005	0.040
Ex004	I004	1.013	0.068	.850	0.064	.081	0.029
Ex006	I006	1.040	0.066	.778	0.061	.030	0.029
Ex008	I008	.789	0.063	.679	0.058	-.017	0.029
Ex010	I010	.098	0.074	1.153	0.068	-.083	0.028
Ex011	I011	-.756	0.083	.158	0.059	.017	0.052
Ex012	I012	.710	0.077	1.172	0.078	-.053	0.027
Ex014	I014	-.168	0.074	1.038	0.060	-.027	0.031
Ex015	I015	-.696	0.082	.026	0.062	-.006	0.055
Ex016	I016	.197	0.072	.888	0.061	.038	0.030

Ex017 I017	-.647	0.074	.461	0.053	-.031	0.042
Ex018 I018	.397	0.073	1.024	0.068	-.013	0.028
Ex020 I020	.291	0.068	.837	0.060	-.025	0.030
Ex022 I022	.733	0.067	.800	0.062	-.006	0.029
Ex024 I024	.006	0.075	.929	0.060	.053	0.032
Ex025 I025	.060	0.063	.384	0.052	.055	0.036
Ex026 I026	.216	0.070	.808	0.059	.034	0.031
Ex028 I028	-.080	0.063	.536	0.052	-.083	0.034
Ex029 I029	-.867	0.087	.194	0.059	.021	0.053
Ex030 I030	.242	0.066	.567	0.054	.125	0.033
Ex032 I032	.467	0.063	.617	0.056	.008	0.031
Ex033 I033	-1.313	0.086	.718	0.056	-.104	0.047
Ex034 I034	.032	0.067	.652	0.054	.027	0.033
Ex036 I036	.196	0.071	.783	0.059	.107	0.032
Ex037 I037	-.484	0.070	.549	0.052	-.070	0.038
Ex038 I038	.042	0.073	.963	0.061	-.004	0.030
Ex039 I039	-.671	0.077	.586	0.052	.027	0.041
Ex040 I040	.082	0.074	.923	0.061	.047	0.031
Ex041 I041	-.002	0.059	.205	0.052	-.072	0.039
Ex042 I042	-.101	0.066	.603	0.053	-.028	0.034
Ex043 I043	-.403	0.073	.438	0.052	.091	0.040
Ex044 I044	.283	0.070	.817	0.060	.053	0.031
Ex046 I046	.016	0.067	.590	0.054	.041	0.034
Ex047 I047	-.509	0.073	.296	0.054	-.010	0.044
Ex048 I048	.017	0.067	.548	0.053	.065	0.035
Ex050 I050	.674	0.061	.556	0.055	.039	0.031
Ex051 I051	-.735	0.081	.153	0.060	-.057	0.052
Ex052 I052	.694	0.060	.558	0.056	-.043	0.031
Ex053 I053	-1.643	0.102	.624	0.063	-.134	0.057
Ex054 I054	-.391	0.074	.757	0.053	.040	0.036
Ex056 I056	.203	0.066	.564	0.055	.078	0.033
Ex058 I058	1.237	0.056	.333	0.052	-.017	0.033
Ex061 I061	-1.867	0.116	.571	0.066	.010	0.062
Ex062 I062	.451	0.083	1.193	0.080	.121	0.030

**No. of Items = 45 No. of Persons = 404**

**Separation Index = 0.876**