Collaborative learning for collaborative working? Initial findings from a longitudinal study of health and social care students

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Abstract

This paper presents the initial findings from a longitudinal quantitative study of two cohorts of students who entered the 10 pre-qualifying programmes of the Faculty of Health and Social Care, University of the West of England (UWE), Bristol, UK. The overall aim of the study is to explore students' attitudes to collaborative learning and collaborative working, both before and after qualification. On entry to the faculty, 852 students from all 10 programmes completed the UWE Entry Level Interprofessional Questionnaire, which gathered baseline data concerning their self-assessment of communication and teamwork skills, and their attitudes towards interprofessional learning and interprofessional interaction. Comparative analysis of these data was undertaken in terms of demographic variables such as age (i.e. older or younger than 21 years), experience of higher education, prior work experience and choice of professional programme. The results indicate that most students rated their communication and teamwork skills positively, and were favourably inclined towards interprofessional learning, but held negative opinions about interprofessional interaction. Some student groups differed in their responses to some sections of the questionnaire. Mature students, and those with experience of higher education or of working in health or social care settings, displayed relatively negative opinions about interprofessional interaction; social work and occupational therapy students were particularly negative in their responses, even after adjustment for confounding demographic variables. The paper concludes by considering the implications of the findings for interprofessional educational initiatives and for professional practice.

Keywords: communication skills, curriculum evaluation, health care, interprofessional education, pre-qualifying programmes, social care

Introduction

This paper describes the initial findings from a study which is a component in a broader research programme being conducted to evaluate an interprofessional pre-qualifying curriculum at the Faculty of Health and Social Care, University of the West of England (UWE), Bristol, UK. This curriculum was introduced across all its professional programmes in 2000 in response to an increasing emphasis on improving interprofessional collaboration for the benefit of service users by providing interprofessional learning opportunities for students (Department of Health 1994, 1999, Miller *et al.* 1999). A core feature of the curriculum is the inclusion of an interprofessional module in each year of study. In these modules, students from different professional programmes learn together, following the principles of enquiry-based learning (Barrett *et al.* 2003).

The professions involved in the interprofessional curriculum are adult nursing, children's nursing, learning disabilities nursing, mental health nursing, midwifery, social work, occupational therapy, physiotherapy, diagnostic imaging and radiotherapy. All faculty programmes are offered at degree level. In addition, students on nursing programmes have the opportunity for diploma level study. The faculty is not responsible for medical education.

The benefits of interprofessional education have been widely assumed, despite an absence of conclusive evidence for its effectiveness (Barr *et al*. 2000). In their critical review of evaluations covering 30 years of interprofessional education, Freeth *et al*. (2002) found only 13 studies of pre-qualifying interprofessional education which were sufficiently robust and clearly reported to be grouped with their higher quality subset. Most of these were North American, and it cannot be assumed that results from one country are transferable to another, given the prevailing differences in health and social care education and organisation. Only two of the studies were from the UK (Carpenter 1995a, Parsell *et al*. 1998): in both these cases, the educational initiative being evaluated lasted only 1–2 days.

The overall aim of the faculty's research programme is to gain an understanding of the effects of a pre-qualifying interprofessional curriculum on health and social care students' collaborative learning and working, both before and after qualification. For the purposes of the curriculum evaluation, 'collaborative learning' is considered synonymous with 'interprofessional education', as defined by the UK Centre for the Advancement of Interprofessional Education: 'when two or more professions learn with, from and about one another' (Centre for the Advancement of Interprofessional Education 1997). The multi-method programme comprises six interlinked studies, through which data are being collected concerning students' reactions, attitudes and perceptions, the learning process and relevant information about context. The research programme commenced in 2001, one year after the introduction of the interprofessional curriculum.

This paper focuses on a longitudinal quantitative study within the programme. The aim of this study is to explore health and social care students' self-assessment of their communication and team work skills, and their attitudes to collaborative learning and collaborative working during their pre-qualifying education and in practice as qualified professionals.

Subjects and methods

The research design attempts to address some deficiencies identified in existing research into interprofessional education (Barr *et al*. 2000, Freeth *et al*. 2002). In particular,

the research team has addressed the issues of adequate participant numbers and the collection of baseline data where pre- and post-test measures are being applied. The study focuses on two cohorts of students on the faculty's current interprofessional curriculum, approximately 950 students.

Measurement of students' self-assessment of skills and attitudes is planned as follows:

- at the beginning of a professional programme (baseline data);
- in the second year of study (interim data);
- at qualification (qualifying data); and
- 9 months after qualification (practice data), if in professional practice.

This sequence of measurements will allow any changes in students' responses as they progress through their professional programmes and out into practice to be reviewed. Students from different professional disciplines can be compared over the course of their education, and differences between students related to demographic variables can be identified.

Instruments

Because of the study population size, a self-completion questionnaire was chosen as the data collection instrument. A set of three related questionnaires was developed, the first for use as students begin their professional programme (UWE Entry Level Interprofessional Questionnaire, ELIQ), the second during the second year of study (UWE Interim Interprofessional Questionnaire, IIQ), and the third on qualification and after 9 months of professional practice (UWE Final Interprofessional Questionnaire, FIQ). The same core sets of statements are used in each of the three questionnaires. The ELIQ also asks respondents at entry level to provide details about their age, gender, ethnicity, educational background and work history.

The range of the faculty's professional groups precluded using any existing scales already in the public domain. The Readiness for Interprofessional Learning Scale (Parsell & Bligh 1999) uses terminology which was seen as inappropriate for data collection with social work students; the Healthcare Stereotypes Scale (Carpenter 1995b, Hind *et al*. 2003) and similar instruments have been developed for use with student groups which include medical students or doctors, who are not included in this study. Instruments assessing stereotypes ask students to record their perceptions of different professions. The faculty's practice of treating the four branches of nursing as separate professional groups (resulting in the representation of 10 professions in the study cohorts) meant that a questionnaire collecting data

on stereotypes about all the professions participating in the interprofessional curriculum would be inappropriately time-consuming to complete. Furthermore, it was not thought helpful to ask students directly about positive and negative perceptions of their own and other specified professions at the beginning of their professional education. For similar reasons, the research team decided against using the instrument developed by Brown *et al.* (1986) to ask students directly about the strength of their own professional identity. The research team chose to develop data collection instruments which made no reference to specific professions in order to avoid influencing or reinforcing professional socialisation.

The decision to collect baseline data also limited the value of existing scales which assess perceptions of individual professional practice (Leucht *et al.* 1990, Hayward *et al.* 1996). On entry to a professional programme, students may have little understanding of professional practice. Nevertheless, questions aimed at students' perceptions of the interaction between health and social care professionals are included in the ELIQ, in accordance with the focus of the research on collaborative learning and working.

Development of the collaborative learning and working scales

Faculty researchers from a range of professions (adult nursing, midwifery, physiotherapy and social work), a psychologist and an epidemiologist collaborated on the design of the ELIQ. The team collectively generated a number of statements based on issues identified from the literature. The literature review established three specific areas for exploration. Using the statements generated, three attitude scales were constructed to address these areas:

1 The Communication and Teamwork Scale: Successful interprofessional collaboration depends on effective interpersonal communication (Henneman *et al.* 1995, Ovretveit 1997, Miller *et al.* 2001). Therefore, the research team wished to discover how students assess their own communication and teamwork skills. Some statements for this area were taken from an existing scale used for self-assessment of communication skills by candidates applying for fast-stream entry to the Civil Service (H.M. Government 2001), and are reproduced with the permission of the Controller of The Stationery Office and the Queen's Printer for Scotland.
2 The Interprofessional Learning Scale: The timing of an interprofessional educational initiative, and participants' attitudes towards it, may impact on its effectiveness (Barr *et al.* 2000). It was considered important to explore students' attitudes towards

learning in an interprofessional context, with specific reference to their pre-qualifying status.
3 The Interprofessional Interaction Scale: The quality of relationships between professionals is seen as crucial to successful interprofessional working (Gerrish 1999, Fowler *et al.* 2000, Cook *et al.* 2001). An area of interest was students' perceptions of the way health and social care professionals relate to each other when they interact.

The two follow-up questionnaires (the IIQ and FIQ) also incorporate these three scales. Each scale contains nine statements (see 'Appendix 1'). Exploratory factor analysis confirmed that all the statements in a scale have a loading > 3.5 on to only one factor (Spector 1992).

Each statement requires rating by respondents along a Likert scale. Where it is assumed that a respondent will always have an opinion, the neutral point on a Likert scale is equated with missing data; however, ignorance may prevent the respondent from having an opinion, in which case the neutral point becomes a valid response choice (Schuman 1996). Since all students will have had previous experience of communicating within a group (no matter how informal), there is no neutral point for the statements dealing with communication and teamwork skills. For all the other statements, the neutral point is included in conventional five-point Likert scales.

Each point on the Likert scale is assigned a value, ranging from (1) 'strong agreement' to (4) 'strong disagreement' for the statements in the first attitude scale, and from (1) 'strong agreement' to (5) 'strong disagreement' in the other two attitude scales. After completion, statement values are reversed where necessary. The cumulative value of the responses to the statements in each attitude scale comprises the respondent's score for that scale (Oppenheim 1996).

For the first scale, the maximum score is 36, while the minimum is 9. Scores from 9 to 20, 21 to 25 and 26 to 36 are considered to indicate, respectively, positive, neutral and negative self-assessment of communication and teamwork skills. Similarly, scores from 9 to 22, 23 to 31 and 32 to 45 for the second and third scales indicate positive, neutral and negative attitudes towards interprofessional learning and perceptions of interprofessional interaction (both these scales have a maximum score of 45).

The ELIQ was piloted with 27 students from a cohort not included in the main evaluation, and some revisions to question wording were made before data collection started.

Reliability and validity

The three scales used in the ELIQ, together with a potential fourth scale concerning respondents' perceptions of

their own relationships with colleagues in health and social care, comprise the UWE Interprofessional Questionnaire (IPQ).

To assess the stability of the scales used in the ELIQ, a test–retest administration of the UWE IPQ was conducted with 90 respondents who were not participating in the research programme. These individuals completed it twice over a period of 1–2 weeks. Using the SPSS for Windows Version 11 computer program, Pearson's correlation coefficients for the scores on the three scales were found to be 0.78 ($P < 0.001$), 0.86 ($P < 0.001$) and 0.77 ($P < 0.001$), respectively. The internal consistency of each scale was assessed by means of Cronbach's alpha coefficient. The coefficients obtained were 0.76 ($n = 813$), 0.84 ($n = 836$) and 0.82 ($n = 825$). The combination of the results of the repeat administration and the alpha coefficients indicates that the questionnaire satisfies conditions for adequate reliability (Spector 1992, Oppenheim 1996).

The research team have established concurrent validity for two of the scales. Two measures in the public domain were identified that, while not meeting all the requirements for the study *per se*, appear to measure similar constructs to the first two scales. It was decided to compare responses to the scale concerning teamwork and communication skills with those to the Interpersonal Communication Competence Scale (Rubin & Martin 1994), and responses to the scale concerning interprofessional learning with those to the Readiness for Interprofessional Learning Scale (Parsell & Bligh 1999).

Forty nursing students who were not participating in the research programme were asked to complete the UWE IPQ and the other two measures at the same time, on one occasion only. Results were analysed using SPSS for Windows Version 11, in terms of interscale correlation (Oppenheim 1996). Pearson's correlation coefficients for the scores on the two pairs of scales were 0.85 ($P < 0.001$) and 0.84 ($P < 0.001$), respectively.

No measure was found suitable for establishing concurrent validity of the third scale, i.e. the scale concerning students' perceptions of interprofessional interaction in health and social care. However, the categorisation of individual student responses was found to be supported by qualitative data from another study in the programme, in which students are interviewed individually about this area.

Given all the above results, it is felt that findings arising from the administration of the ELIQ can be viewed with confidence.

Ethics

Ethical approval for the study was granted by the university ethics committee. All students in the participating cohorts were given an information sheet about the study and an opportunity to ask questions. Participating students consented in writing.

Data collection and analysis

Data collection began as students entered the faculty, before exposure either to the interprofessional curriculum or the multi-professional environment. Students in two separate intakes (September 2001 and January 2002) completed the ELIQ during their induction weeks. Most of the students attend a multi-professional campus, but a sizeable minority are based on a site offering only two nursing programmes.

Data analysis was performed using SPSS for Windows, Version 11. Initial analysis of demographic data was performed in terms of descriptive statistics. The chi-square (χ^2) test was used to compare student groups, based on choice of professional programme, type of campus attended (site 1 or 2) and intake (cohort 1 or 2) over the following variables: age, gender, educational history, ethnicity and type of work experience.

Relationships between statement responses and demographic data, and statement responses and professional programme were also explored. For each of the three scales, the scores are not normally distributed and data sets vary considerably in size, and therefore, non-parametric tests (Mann–Whitney U-test for two unrelated variables, and Kruskal–Wallis H-test for more than two unrelated variables) were used. The results for the Mann–Whitney U-test are given in terms of the Z-statistic, which is obtained through correcting for tied ranks in the data. The significance level for analysis was set at 0.05 (Bryman & Cramer 2001). Missing data have not been included in the analysis.

Results

Response rates

Six hundred and forty-three students from 10 different programmes completed questionnaires in the first intake (cohort 1), out of a total of 710 (90.6%). The second intake (cohort 2) only involved three nursing programmes: 209 students completed questionnaires, out of a total of 232 (90.1%). The response rate over both cohorts was 90.4%; the remaining students were either not present or preferred not to participate in the study. The present paper describes results for the total sample of 852 students. Student numbers vary considerably for each programme, and this is reflected in the respondent numbers, which range from 420 adult nursing students to 11 learning disabilities nursing students (Table 1).

Table 1 Percentage of the sample represented by each programme, the number in the sample from each programme, the total number of students on each programme and the percentage of each programme's intake in the sample

Programme	Percentage of sample	Number who responded	Total number on programme	Percentage of total on programme
Adult nursing	49.3	420	457	91.9
Physiotherapy	14.9	127	133	95.5
Mental health nursing	8.9	76	90	84.4
Children's nursing	7.2	61	72	84.7
Midwifery	5.1	43	45	95.6
Diagnostic imaging	4.6	39	47	83.0
Social work	3.6	31	33	93.9
Occupational therapy	3.5	30	32	93.8
Radiotherapy	1.6	14	16	87.5
Learning disabilities nursing	1.3	11	17	64.7
Total	100	852	942	90.4

Table 2 Differences in students' age, based on choice of programme*

| | Age (years) | | | |
| | ≤ 21 years | | > 21 years | |
Programme	Number	Percentage	Number	Percentage
Radiotherapy	11	78.6	3	21.4
Physiotherapy	89	70.1	37	29.1
Diagnostic imaging	27	69.2	12	30.8
Children's nursing	41	67.2	20	32.8
Midwifery	24	55.8	19	44.2
Adult nursing	188	44.8	231	55.0
Learning disabilities nursing	4	36.4	7	63.6
Mental health nursing	20	26.3	55	72.4
Social work	3	9.7	28	90.3
Occupational therapy	0	0.0	30	100
Total	407	48.0	442	52.0

* $\chi^2 = 110.08$, d.f. = 9, $P < 0.001$.

Response rates per programme range from 95.6% to 64.7%. Some 90.1% of the students from these intakes are based on the multi-professional campus (site 1), with the remaining 9.9% based on the campus offering only nursing programmes (site 2).

Demographic differences

The majority of the students in the total sample were white (91.1%), while the largest proportion of another ethnic grouping constituted only 4.5% (black students from Africa). Therefore, no meaningful analysis based on ethnic differences was possible. Most demographic differences found related to programme choice (no significant differences were found between students based on site attended or cohort membership). Programmes had different ratios of mature students (older than 21 years) ($\chi^2 = 110.08$, d.f. = 9, $P < 0.001$) and students of different gender ($\chi^2 = 68.82$, d.f. = 9, $P < 0.001$) (Tables 2

and 3). The proportions of those with vocational qualifications ($\chi^2 = 46.33$, d.f. = 9, $P < 0.001$), and with previous experience of working in health or social care settings ($\chi^2 = 150.46$, d.f. = 9, $P < 0.001$) also varied (Tables 4 and 5).

All these results may need to be treated with caution because of the large number of rows in the contingency tables (Campbell & Machin 1993). Nevertheless, examination of the data confirms that there are marked differences over these variables between students on the various programmes.

Differences were also noted in academic background, but no *P*-value was obtainable for this variable since there were too many low-value cells in the contingency table. Some 36.7% of occupational therapy students (*n* = 11) had completed a course of higher education, as had 21.1% of mental health nursing (*n* = 16) and 19.4% of social work (*n* = 6) students. This could be contrasted with 14.0% of midwifery (*n* = 6) and 11.8% of physiotherapy (*n* = 15) students, while fewer than 10% of the

Table 3 Differences in students' gender, based on choice of programme*

| | Sex | | | |
| | Male | | Female | |
Programme	Number	Percentage	Number	Percentage
Learning disabilities nursing	4	36.4	7	63.6
Mental health nursing	26	34.2	50	65.8
Diagnostic imaging	13	33.3	26	66.7
Physiotherapy	27	21.3	100	78.7
Occupational therapy	6	20.0	24	80.0
Social work	3	9.7	28	90.3
Adult nursing	38	9.0	382	91.0
Radiotherapy	1	7.1	13	92.9
Children's nursing	3	4.9	58	95.1
Midwifery	0	0.0	43	100
Total	121	14.2	731	85.8

* χ^2 = 68.82, d.f. = 9, $P < 0.001$.

Table 4 Differences in students' vocational qualifications, based on choice of programme*

| | No vocational qualifications | | Vocational qualifications | |
Programme	Number	Percentage	Number	Percentage
Physiotherapy	121	95.3	6	4.7
Radiotherapy	13	92.9	1	7.1
Occupational therapy	27	90.0	3	10.0
Diagnostic imaging	35	89.7	4	10.3
Children's nursing	51	83.6	10	16.4
Social work	25	80.6	6	19.4
Midwifery	34	79.1	9	20.9
Learning disabilities nursing	8	72.7	3	27.3
Mental health nursing	55	72.4	21	27.6
Adult nursing	296	70.5	124	29.5
Total	187	21.9	665	78.1

* χ^2 = 46.33, d.f. = 9, $P < 0.001$.

Table 5 Differences in students' previous work experience, based on choice of programme*

| | No health or social care experience | | Health or social care experience | |
Programme	Number	Percentage	Number	Percentage
Radiotherapy	12	85.7	2	14.3
Diagnostic imaging	33	84.6	6	15.4
Physiotherapy	94	74.0	33	26.0
Midwifery	30	69.8	13	30.2
Children's nursing	35	57.4	26	42.6
Adult nursing	134	31.9	286	68.1
Learning disabilities nursing	3	27.3	8	72.7
Social work	8	25.8	23	74.2
Mental health nursing	17	22.4	59	77.6
Occupational therapy	6	20.0	24	80.0
Total	480	56.3	372	43.7

* χ^2 = 150.46, d.f. = 9, $P < 0.001$.

Table 6 Associations between age and previous work experience*

	No health/social care experience		Health/social care experience		
Age (years)	Number	Percentage	Number	Percentage	Total (100%)
≤ 21	226	55.5	181	44.5	407
> 21	146	33.0	296	67.0	442
Total	372	43.8	477	56.2	849

* $\chi^2 = 43.56$, d.f. = 1, $P < 0.001$.

Table 7 Associations between age and qualifications*

			Educational qualifications					
	No academic qualifications		Secondary		Higher			
Age (years)	Number	Percentage	Number	Percentage	Number	Percentage	Total (100%)	
≤ 21	8	2.0	395	97.0	4	1.0	407	
> 21	89	20.1	264	59.7	89	20.1	442	
Total	97	11.4	659	77.6	93	11.0	849	

* $\chi^2 = 170.22$, d.f. = 2, $P < 0.001$.

Table 8 Associations between previous work experience and qualifications*

	No vocational qualification		Vocational qualification		
Previous work experience	Number	Percentage	Number	Percentage	Total (100%)
No health/social care experience	314	84.4	58	15.6	372
Health/social care experience	351	73.1	129	26.9	480
Total	665	78.1	187	21.9	852

* $\chi^2 = 15.58$, d.f. = 1, $P < 0.001$.

students on the remaining five professional programmes had experience of higher education.

Associations between demographic variables

Mature students were more likely to have previously worked in health or social care settings ($\chi^2 = 43.56$, d.f. = 1, $P < 0.001$). Compared with younger students, higher proportions of mature students either had no academic qualifications (no formal qualifications from either secondary or higher education) or had experience of higher education ($\chi^2 = 170.22$, d.f. = 2, $P < 0.001$). More students with health or social care experience had vocational qualifications ($\chi^2 = 15.58$, d.f. = 1, $P < 0.001$) (Tables 6–8).

There were significantly more mature male students than female students ($\chi^2 = 5.68$, d.f. = 1, $P = 0.017$). More female students had worked in health or social care settings ($\chi^2 = 4.87$, d.f. = 1, $P = 0.027$). A greater proportion

of female students had completed vocational qualifications ($\chi^2 = 6.27$, d.f. = 1, $P = 0.012$), while comparatively more male students had experience of higher education ($\chi^2 = 21.68$, d.f. = 1, $P < 0.001$) (Table 9).

Analysis of scale scores

There were very few differences found in relation to demographic variables or programme choice in students' responses to the first two scales; students were markedly positive in their assessment of their own communication and teamwork skills and in their attitudes towards interprofessional learning. In contrast, only 5.0% of the students were positive in their response to the scale concerning their perceptions of interprofessional interaction (Figure 1 and Table 10).

Differences were found in students' raw scores for the third scale depending on age ($Z = -5.573$, $P < 0.001$),

Table 9 Differences between male and female students

	Males		Females		Total	
Variable	Number	Percentage	Number	Percentage	Number	Percentage
Age (years)*:						
≤ 21	45	37.8	362	49.6	407	47.9
> 21	74	62.2	368	50.4	442	52.1
Total	119	100	730	100	849	100
Health/social care experience†:						
no	64	52.9	308	42.1	372	43.7
yes	57	47.1	423	57.9	480	56.3
Total	121	100	731	100	852	100
Higher education‡:						
no	93	76.9	666	91.1	759	89.1
yes	28	23.1	65	8.9	93	10.9
Total	121	100	731	100	852	100
Vocational qualification§:						
no	105	86.8	560	76.6	665	78.1
yes	16	13.2	171	23.4	187	21.9
Total	121	100	731	100	852	100

* $\chi^2 = 5.68$, d.f. = 1, $P = 0.017$.
† $\chi^2 = 4.87$, d.f. = 1, $P = 0.027$.
‡ $\chi^2 = 21.68$, d.f. = 1, $P < 0.001$.
§ $\chi^2 = 6.27$, d.f. = 1, $P = 0.012$.
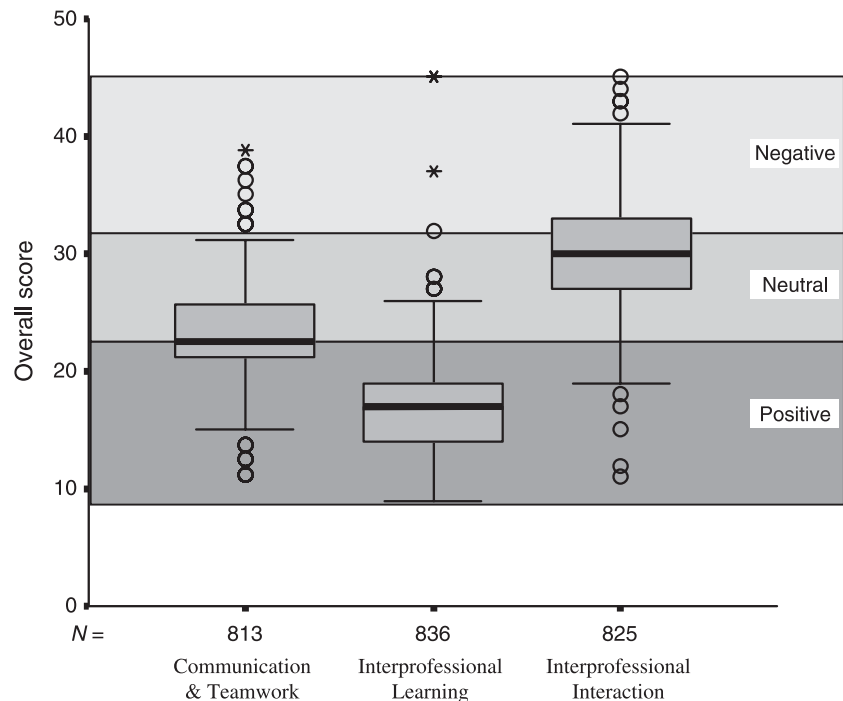
Figure 1 Scores across the whole sample for the three scales, showing medians and quartiles (the scores for the Communication and Teamwork Scale have been scaled to correspond with those from the other two scales).

educational background ($Z = -4.450$, $P < 0.001$) and previous work experience ($Z = -7.161$, $P < 0.001$). Mature students, those educated to degree or postgraduate level, and those with previous experience of working in health or social care settings expressed comparatively negative opinions about interaction between health and social care professionals. Table 11 illustrates the variations in students' categorised scores based on these differences.

Table 10 Summary statistics for the raw scores for the three scales

Scale	Number	Mean	SD	Minimum	First quartile	Median	Third quartile	Maximum
Communication and Teamwork	813	18.6	3.3	9	17	18	21	31
Interprofessional Learning	836	16.7	4.2	9	14	17	19	45
Interprofessional Interaction	825	30.1	4.6	11	27	30	33	45

Table 11 Student groups displaying significant differences in scores for the Interprofessional Interaction Scale

	Positive		Neutral		Negative		
Variable	Number	Percentage	Number	Percentage	Number	Percentage	Total (100%)
Age (years):							
≤ 21	28	7.0	287	71.9	84	21.1	399
> 21	13	3.1	238	56.3	172	40.6	423
Total	41	5.0	525	63.9	256	31.1	822
Higher education:							
no	39	5.3	484	65.9	212	28.8	735
yes	2	2.2	43	47.8	45	50.0	90
Total	41	5.0	527	63.9	257	31.1	825
Health and social care experience:							
no	20	5.6	255	71.0	84	23.4	359
yes	21	4.5	272	58.4	173	37.1	466
Total	41	5.0	527	63.9	257	31.1	825

Differences in students' raw scores for the third scale were also found based on programme choice (Kruskal–Wallis: $\chi^2 = 60.34$, d.f. = 9, $P < 0.001$). When these scores were assigned to categories, it appeared that those respondents studying occupational therapy and social work displayed particularly negative attitudes to this area (Figure 2).

Although demographic variables appear to have influenced these results to a certain extent, the responses from occupational therapy and social work students were still comparatively negative, even after adjustment for demographic factors. In particular, these differences persisted when comparing raw scores among mature students without experience of higher education who had worked in health or social care settings (Kruskal–Wallis: $\chi^2 = 21.81$, d.f. = 8, $P = 0.005$). However, this result must be treated with caution since 159 of the 234 students in this group are adult nursing students; the membership of the other professional groups ranges only from three to 31, while radiotherapy is not represented at all. There were 13 social work and 14 occupational therapy students in this group.

Discussion

The preliminary results for this study raise a number of issues concerning the possible influence of demographic variables on responses to interprofessional education. The interprofessional literature suggests that education levels and perceptions of disparity in academic ability may influence interprofessional education. In an evaluation of an interprofessional module for medical, dental and nursing students, Reeves & Pryce (1998) noted that some nursing students linked differences in entry qualifications with perceptions of inequality between professions. Tunstall-Pedoe *et al.* (2003) report that the medical students in a common foundation programme for medicine, radiography and nursing retained a low opinion of the other students' academic ability, and fewer of them felt that learning with other disciplines enhanced their own learning (49% as opposed to 70%). Tucker *et al.* (2003) recently reported apparent tension between diploma and degree nursing students, illustrating the possible significance of educational qualifications in status differentiation.
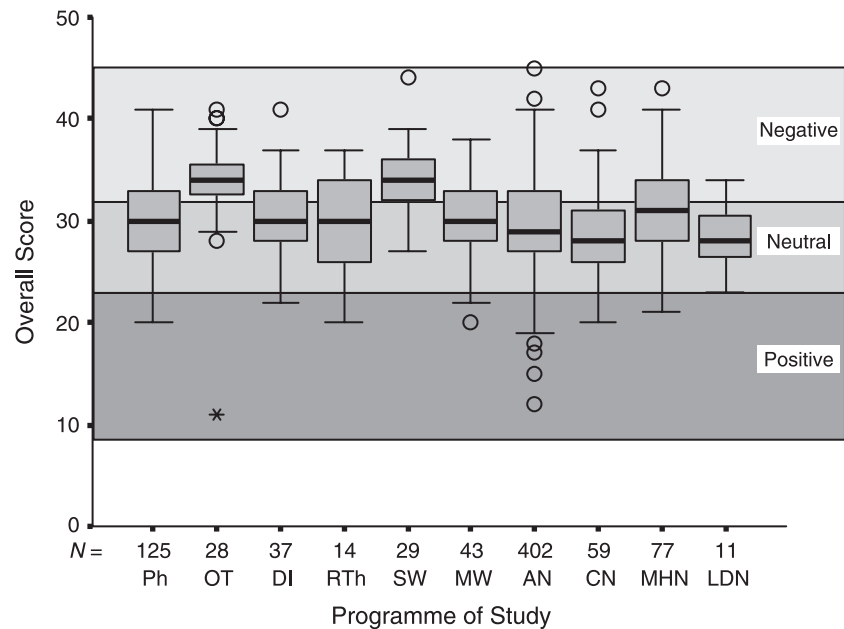
Figure 2 Students' attitudes to interprofessional interaction by programme: (Ph) physiotherapy; (OT) occupational therapy; (DI) diagnostic imaging; (RTh) radiotherapy; (SW) social work; (MW) midwifery; (AN) adult nursing; (CN) children's nursing; (MHN) mental health nursing; and (LDN) learning disabilities nursing.

In this study, students of all educational backgrounds were positive about interprofessional education, but very few were positive about interprofessional interaction. The reason is not clear for the comparatively negative perceptions expressed by students with higher education experience; however, it is possible that these more negative responses may be related to greater awareness amongst graduate entrants of status and power differentials amongst professional groups in health and social care.

There is little discussion about age in the interprofessional literature; however, Tunstall-Pedoe *et al.* (2003) found that school leavers were more likely to be disappointed by their experience of studying with other professions. It will be interesting to see whether the initial positive responses of students of all ages to the Communication and Teamwork Scale and the Interprofessional Learning Scale will be maintained, or whether age differences will affect student responses at later data collection points. It will also be of interest to see whether the more negative views expressed at baseline by mature students about interprofessional interaction remain.

When considering the comparatively negative responses to the Interprofessional Interaction Scale of students with experience of working in health and social care, it is important to note that such experience is likely to have been as unqualified care workers. It is unclear whether their perceptions of that 'low status' role have influenced their responses, or whether negative views are a more general consequence of working in health and social care settings. If so, it can be anticipated that there will be an increase in students' negative percep-

tions of health and social care professionals' interaction as they all gain that experience. Views about interprofessional interaction may also be influenced by exposure to other professionals' opinions. Tunstall-Pedoe *et al.* (2003) found that students with parents who were health care professionals had more stereotyped ideas, both positive and negative, about other professionals.

Reynolds (2003) found that women expressed more trust than men in the quality of information presented by other students in an interprofessional initiative, and greater enjoyment in working with students on another professional course. Although no differences based on gender were found in the students' responses to the questionnaire, the collection of baseline data will allow the attitudes of male and female students to interprofessional learning opportunities to be monitored throughout the course of their professional programmes.

Tunstall-Pedoe *et al.* (2003) identified that stereotypes are present at the outset of a professional programme. One rationale for introducing interprofessional education into pre-qualifying programmes is to limit the influence of stereotypical or 'tribal' attitudes (Herzberg 1999). Learning together before qualification may influence professional socialisation in a manner supportive of teamwork. The significance of participants' attitudes to collaboration for the quality of interprofessional working has been identified in the literature (Gerrish 1999, Fowler *et al.* 2000, Cook *et al.* 2001, Elston & Holloway 2001, van Eyk & Baum 2002). Changes in students' opinions about interprofessional working would be a significant outcome of the interprofessional curriculum. However, the Interprofessional Interaction Scale shows

that students on entry to pre-qualifying programmes do not hold positive views about collaborative working relationships in health and social care.

Two professional groups, occupational therapy and social work, held particularly negative views of interprofessional interaction on entry to their professional programme, even after adjustment for confounding demographic factors. In an evaluation of an interprofessional community mental health programme involving social workers, occupational therapists, psychiatrists, psychologists and community psychiatric nurses, Barnes *et al.* (2000) noted that there was strong evidence for the existence of interprofessional stereotypes. Social workers saw themselves as sharing a broader life experience than other groups and occupational therapists rated themselves as superior in practical skills. It is possible that social workers and occupational therapists have a particularly low opinion of the ability of professionals to communicate openly and accord each other equal respect. Most students entering both professional programmes in the faculty had prior experience in relevant agencies, and hence, could have been influenced by views of qualified professionals. The response of these two groups of students will be noted with particular interest throughout the longitudinal study.

The non-positive attitudes displayed by the majority of students towards interprofessional interaction must be a matter of concern. It is the older and more experienced students (in terms of both education and employment in health and social care) who hold most negative views. Should these variations persist, there may be implications for educators designing interprofessional learning experiences. Mature students, students with prior experiences of health and social care, and students with higher education qualifications may have a breadth of knowledge and experience which could contribute to constructive discussion in interprofessional learning groups. However, their more negative perceptions of interprofessional interaction may influence the perceptions of other students.

It is encouraging that students, in common with entry-level students who participated in other studies (Hind *et al.* 2003, Tunstall-Pedoe *et al.* 2003), showed positive attitudes towards interprofessional learning, as well as assessing their own communication and teamwork skills positively. However, the accuracy of students' reported self-assessment of communication and teamwork skills is a matter for consideration. The research team is aware that, even if students have the skills for accurate self-assessment, the correlation between expressed attitudes/self-assessment and behaviour cannot be guaranteed (Hayes 1994). However, the wider research programme will collect data from subgroups of students in order to explore such issues through data triangulation. Some interprofessional learning groups are part of a parallel qualitative study of the learning process.

Conclusion

At the beginning of their pre-qualifying education, students on 10 professional programmes were positive about their communication and teamwork skills, and positive about learning with students from other professional disciplines. Students held less positive views about interprofessional interaction. Mature students, students with higher qualifications, students with prior work experience in health and social care, and social work and occupational therapy students held particularly negative opinions about the way that health and social care professionals work together. The longitudinal study of two cohorts of students on an interprofessional curriculum in the UWE Faculty of Health and Social Care follows them throughout their programme and their first year of professional practice. Self-assessment and attitudinal data are being collected at four separate time points and will provide measures of change in attitudes and self-reported skills, allowing further exploration of the influence of demographic variables and professional programme on interprofessional learning. The large number of students involved in the study and the high response rate are particular strengths of this research. The longitudinal cohort study is part of a wider research programme studying interprofessional learning outcomes, learning processes and the social context (both in the university and in placement settings) in which the learning takes place.

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Appendix 1: The scales used in the University of the West of England, Bristol Entry Level Interprofessional Questionnaire

The statements marked with an asterisk (*) were taken from an existing scale used for the self-assessment of communication skills by candidates applying for fast-stream entry to the Civil Service (H.M. Government 2001), and are reproduced with the permission of the Controller of The Stationery Office and the Queen's Printer for Scotland.

Communication and Teamwork Scale

1 I feel comfortable justifying recommendations/advice face-to-face with more senior people.*
2 I feel comfortable explaining an issue to people who are unfamiliar with the topic.*
3 I have difficulty in adapting my communication style (oral and written) to particular situations and audiences.*
4 I prefer to stay quiet when other people in a group express opinions that I don't agree with.
5 I feel comfortable working in a group.*
6 I feel uncomfortable putting forward my personal opinions in a group.
7 I feel uncomfortable taking the lead in a group.
8 I am able to become quickly involved in new teams and groups.*
9 I am comfortable expressing my own opinions in a group, even when I know that other people don't agree with them.

Interprofessional Learning Scale

10 My skills in communicating with patients/clients would be improved through learning with students from other health and social care professions.
11 My skills in communicating with other health and social care professionals would be improved through learning with students from other health and social care professions.

12 I would prefer to learn only with peers from my own profession.
13 Learning with students from other health and social care professions is likely to facilitate subsequent working professional relationships.
14 Learning with students from other health and social care professions would be more beneficial to improving my teamwork skills than learning only with my peers.
15 Collaborative learning would be a positive learning experience for all health and social care students.
16 Learning with students from other health and social care professions is likely to help to overcome stereotypes that are held about the different professions.
17 I would enjoy the opportunity to learn with students from other health and social care professions.
18 Learning with students from other health and social care professions is likely to improve the service for patient/client.

Interprofessional Interaction Scale

19 Different health and social care professionals have stereotyped views of each other.
20 The line of communication between all members of the health and social care professions is open.
21 There is a status hierarchy in health and social care that affects relationships between professionals.
22 Different health and social care professionals are biased in their views of each other.
23 All members of health and social care professions have equal respect for each discipline.
24 It is easy to communicate openly with people from other health and social care disciplines.
25 Not all relationships between health and social care professionals are equal.
26 Health and social care professionals do not always communicate openly with one another.
27 Different health and social care professionals are not always cooperative with one another.